



OPERATING INSTRUCTIONS FOR THE PRECISION TOOL
GRINDING AND LAPPING MACHINES TYPE 150-A, 175-A, 175-AR

INSTALLATION :

Cleaning :

All machined surfaces are smeared with a rust preventative which should be carefully removed using clean rags soaked in paraffin, paying particular attention to the guide shaft.

Siting :

The machine should be placed on a vibration-free base. It is not normally necessary to bolt the machine down but is advisable to use an anti-vibration base to isolate the machine from outside vibrations. It is not absolutely necessary for the machine to be level.

Lubrication :

1. Before starting up, the two oil bottles on the wheelhead casing must be filled with a light spindle oil (viscosity 3⁰E at 20°C). Each bottle must be regulated to give 10 - 12 drops of oil per hour. The knobs on top of the bottles should be set in the horizontal position see form. 489.111.57 when the machine is not in use, so cutting off the oil supply.
2. The motor bearings are grease packed at assembly.

Coolant :

The coolant tank should be filled with about 2½ gallons of coolant suitable for diamond grinding.

Recommended coolants:

- a) a mixture of 3 parts petroleum to 1 part light oil.
- b) odourless, distilled petrol Fol K or similar liquids on mineral oil base.
- c) water soluble chemical emulsions should be carefully tested, as they generally corrode the painting and form hard deposits.

Electrical connections:

The supply is taken through the hole in the rear of base (32" from floor) direct to the hand switch. The motor connections are shown on the accompanying electrical diagram 7.71.00.11.

The supply is also connected to the hand switch on machines ordered with thermal overloads for the motors (See diagram 7.71.01.01)

Ausf. Dat:

Vls:

Interne Nr.:

AGATHON A.-G.
MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

7.74.00.00.0 e

Verwendet für:

Lieferant:

Viewed from the front of the machine the grinding wheels should rotate towards the operator, from top to bottom. The coolant pump will then also rotate in the correct direction.

Grinding instructions :

Carbide tipped tools should be sandblasted and if necessary, the shank material cleared away after brazing. The latter applies also to chipped tools.

The tool is held on the support with the tool clamp or collets and the cutting and clearance angles are set according to the scales. Slide the tool support along the guide shaft to within approx. 1/32" of the wheel, then clamp it.

It is advisable to clamp the depth stop lever on the right hand side, oscillate the guide shaft and merely slide the support along it. In this way damage to the grinding wheel is avoided.

Adjust the coolant jet onto the tip of the tool and not onto the grinding wheel. Start up the machine. With the right hand oscillate the tool support backwards and forwards. The fine feed is applied with the micrometer screw, using the left hand. The amount of feed depends on the grit size of the diamond wheel. As a general guide, the depth of cut should not exceed one quarter of the size of the diamond grits. Excessive depths of cut will cause heating of the tips and considerably accelerate wheel wear. Whenever possible, the complete width of the diamond wheel flange should be used to ensure even wear of the wheel.

Decrease the clearance angle by 1 - 2°, move the support along the guide shaft to the lapping wheel and lap the tool.

Particular attention should be paid to the following points :

- a) always grind into the cutting edge of the tool.
- b) make it a habit never to start the machine until the tool is clamped, angles set and the support correctly positioned. In this way damage to the grinding wheels will be avoided.
- c) never grind dry !
- d) work by " feel " and sound !
- e) grinding wheels will only cut efficiently if they are running true.

Care of the machine :

The grinding spindle is run-in at assembly and should reach a temperature of 40°C maximum after half an hours running. Over-tightened belts and bad lubrication will cause damage to the precision plain bearings.

Clean coolant and daily cleaning of the guide shaft will reduce wear.

Verwendet für:

Lieferant:

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MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

4.129/31

Belt changeing :

The belts should be changed as follows :

1. Remove wheelguards, diamond wheels and the cover plate at the rear of the wheelhead.
2. Unlock spindle pulley (minimum 8 turns). After slackening the belt, raise the motor plate with the adjusting screw.
3. Viewed from the front of the machine the spindle can be lightly tapped with a hide hammer to the right. Withdraw the spindle to the right at the same time supporting the spindle pulley.
4. Change the belts.
5. Insert the spindle through the bearing and the pulley. Line up the flange with the keyway and push it on. Remount the grinding wheels and guards and tighten them up until the flange is clamped.
6. Tighten spindle pulley and check the belt tension. Secure the motor plate and replace wheelhead cover plate.
7. Set spindle axial clearance according to instructions on page 124/22. The correct axial play is 9 - 12 (0,00035"-0,00047").

Verwendet für:

Lieferant:

Ausf: Dat:

Vis:

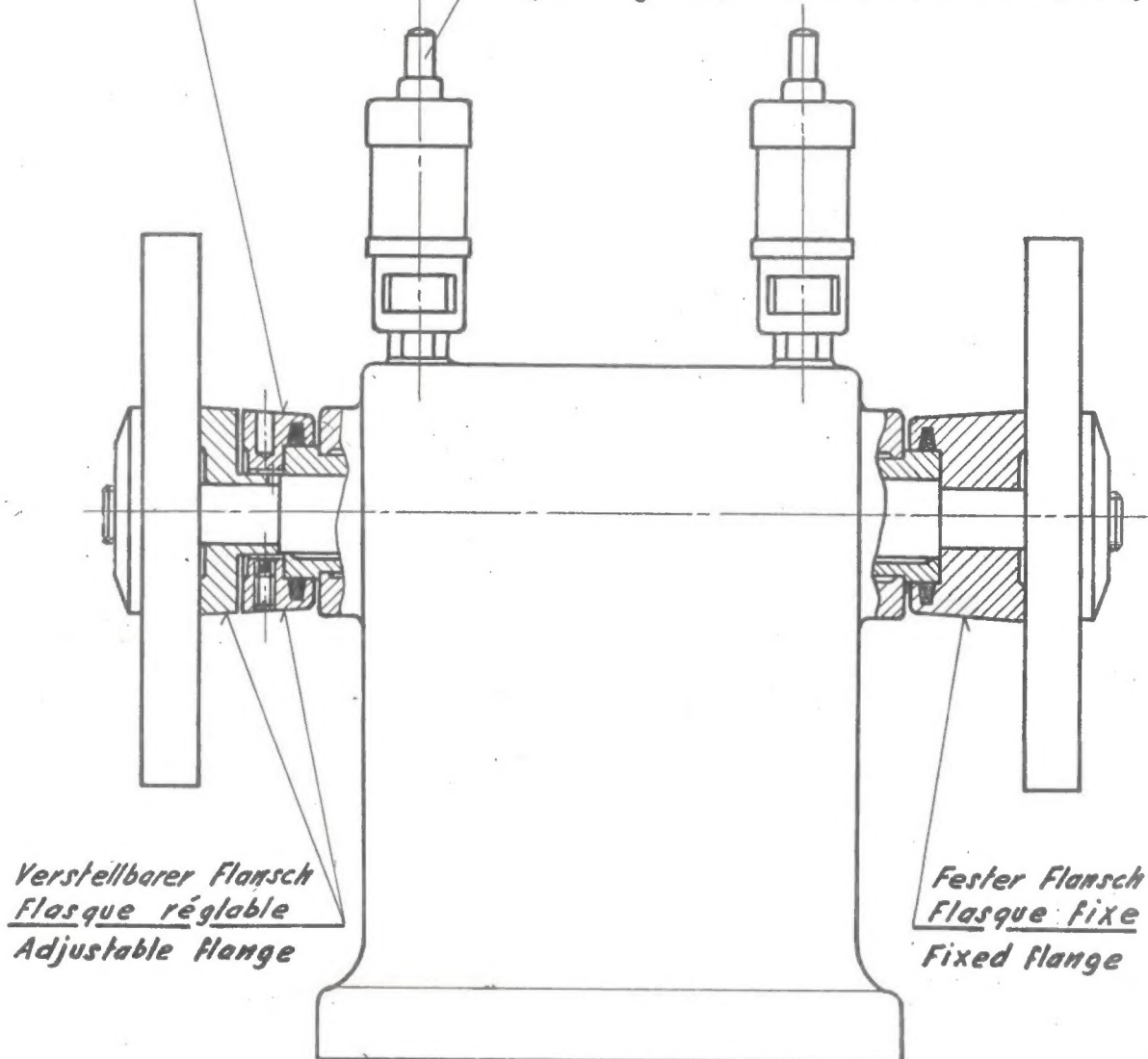
Interne Nr:

AGATHON A.-G.
MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

4.129/32

Stellmutter für Achsialspiel-Nachstellung (Rechtsgewinde).
 Ecrou pour rattrapage de jeu latéral (Filetage à droite).
 Adjusting nut for taking up axial play (right-hand thread)

Regul. Tropföler für Öl visc. 3,-°E (20°C).
 Graisseur à égouttement régl. pour huile visc. 3,-°E (20°C).
 Regulating drop-feed oiler for oil visc. 3,-°E (20°C)



Achsialspiel ist auf 9 bis 12 μ eingestellt
 Jeu latéral est réglé de 9 à 12 μ
 Axial play has been adjusted from 9 to 12 μ

Headstock
 for Grinding and Lapping Machines 150 A & 175 A
Spindelstock
 für Schleif- und Läppmaschine 150 A & 175 A
Poupée
 pour machine d'affûtage et de glosage 150 A & 175 A

Ersatz für: 124/22

Maßstab	Gezeichnet	9.12.47	Hoffm.
	Geprüft		D:
	Gesehen		

IMPORTANT ! Lubrication of the spindle bearings after long shut-down period :

It is possible that after an extended idle period (transport, storage, etc) the spindle will be stiff due to solidification of the oil.

To prevent damage to the precision bearings, they should be cleaned as follows, see drawing 7.74.00.00.3

1. Remove two drain plugs, at front of wheelhead.
2. Fill the two oil bottles with clear paraffin. Allow the paraffin to run through the bearings whilst turning the spindle by hand, until all impurities have washed through and clear paraffin runs from the drain holes.
3. Repeat the above procedure using spindle oil (viscosity 3°E at 20° C - 1.6° E at 50° C) and allowing the spindle to run under power until oil flows freely from the drain holes.
4. Replace the drain plugs and the machine is ready for service.
5. Allow the spindle to run under observation.
6. The working temperature of the spindle should not exceed 36° - 40° in a room temperature of 18 - 20° C. If the room temperature is higher than 20° C, the spindle temperature will be proportionately higher.

Setting the axial play of the grinding spindle :

1. Clamp a dial indicator in the tool support and register it on the side of the grinding wheel flange. Check that axial movement of spindle lies between 0,00035" and 0,0008".

To adjust the axial play, loosen the two grub screws in the left hand flange (adjustable flange) and turn the flange using a tommy bar 0,196" dia.

The play will be reduced if the flange is turned towards the front and vice versa.

2. Tighten grub screws. Check.

When starting up the machine, check that the diamond wheels are not over-tightened.

Verwendet für:

Lieferant:

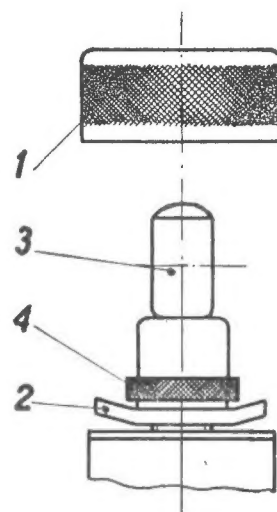
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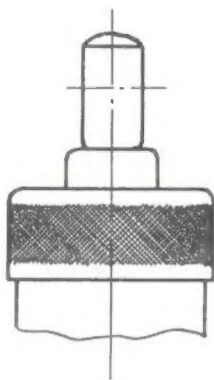
Verwendet für:

Setting the drip - oilers :

1. Remove cap "1".
2. Screw down wing nut "2".
3. Set knob "3" vertical.
4. Adjust flow with nut "4" to 5-10 drops/hour.
5. Lock nut "4" with wing nut "2".
6. Replace cap "1".

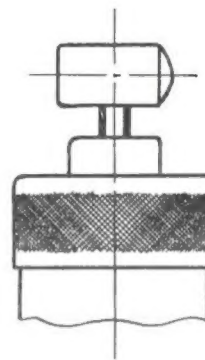


Oiler operating



Oiler shut-off

Position of knob when machine is not in use.



Lieferant:

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Interne Nr:

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MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

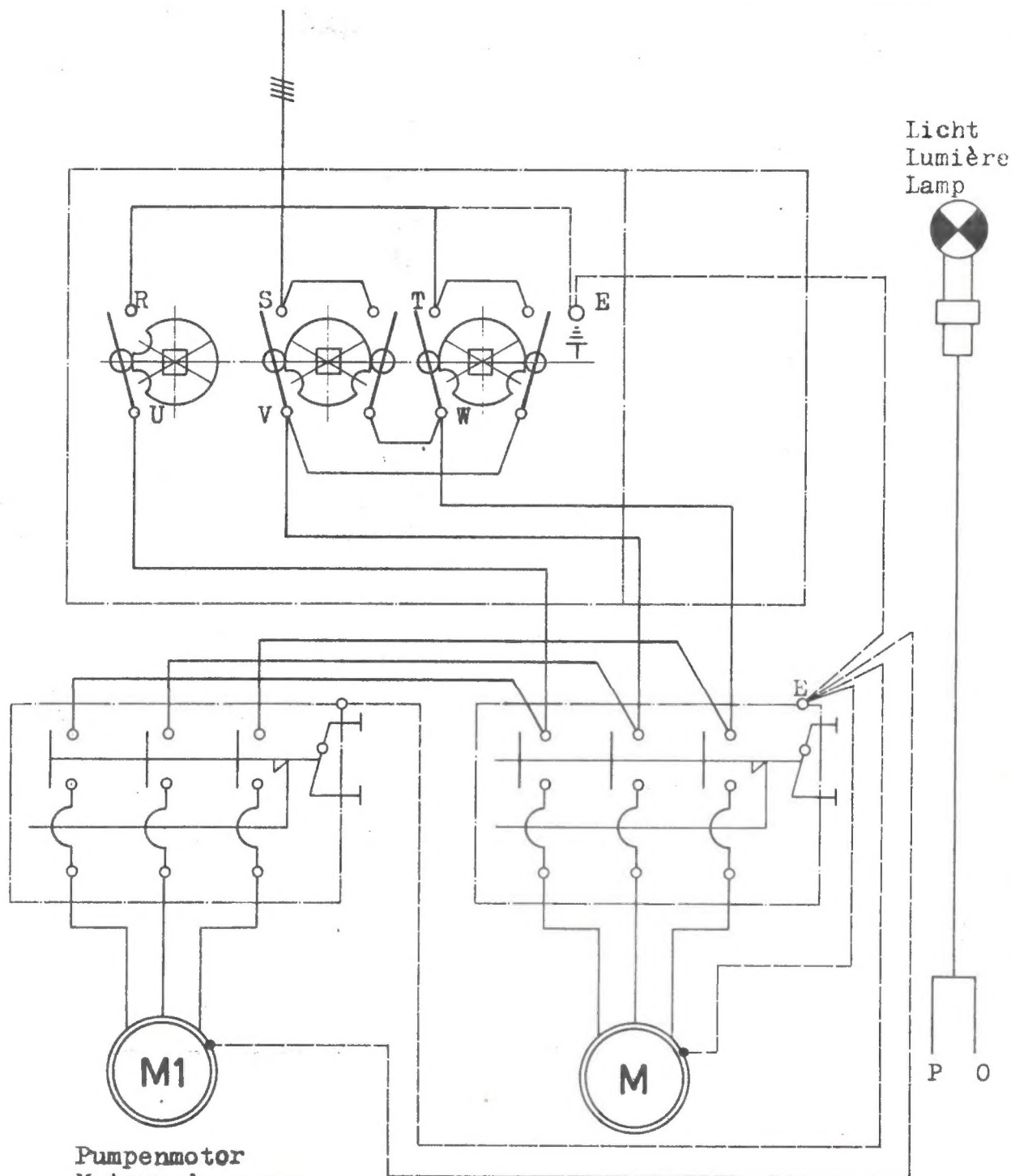
form. 489.111.57

Schema des Motorschutzschalters zu 150-A, 175-A, 175-AR

Schéma de l'interrupteur de protection pour 150-A, 175-A, 175-AR

Schema of the thermal overload starter for 150-A, 175-A, 175-AR

Verwendet für:



Pumpenmotor
Moteur de pompe
Pump-motor

Hauptmotor
Moteur principale
Main motor

150-A und 175-A , 175-AR	M	=	550 W	(0,75 PS)
150-A und 175-A , 175-AR	M1	=	75 W	(0,10 PS)
150-A und 175-A , 175-AR	L	=	40 VA	

Ersatz für: 7.71.01.00

Ausf. Dat: 36.66 Vis: 2.4.66
Interne Nr.: 770

AGATHON A.-G.
MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

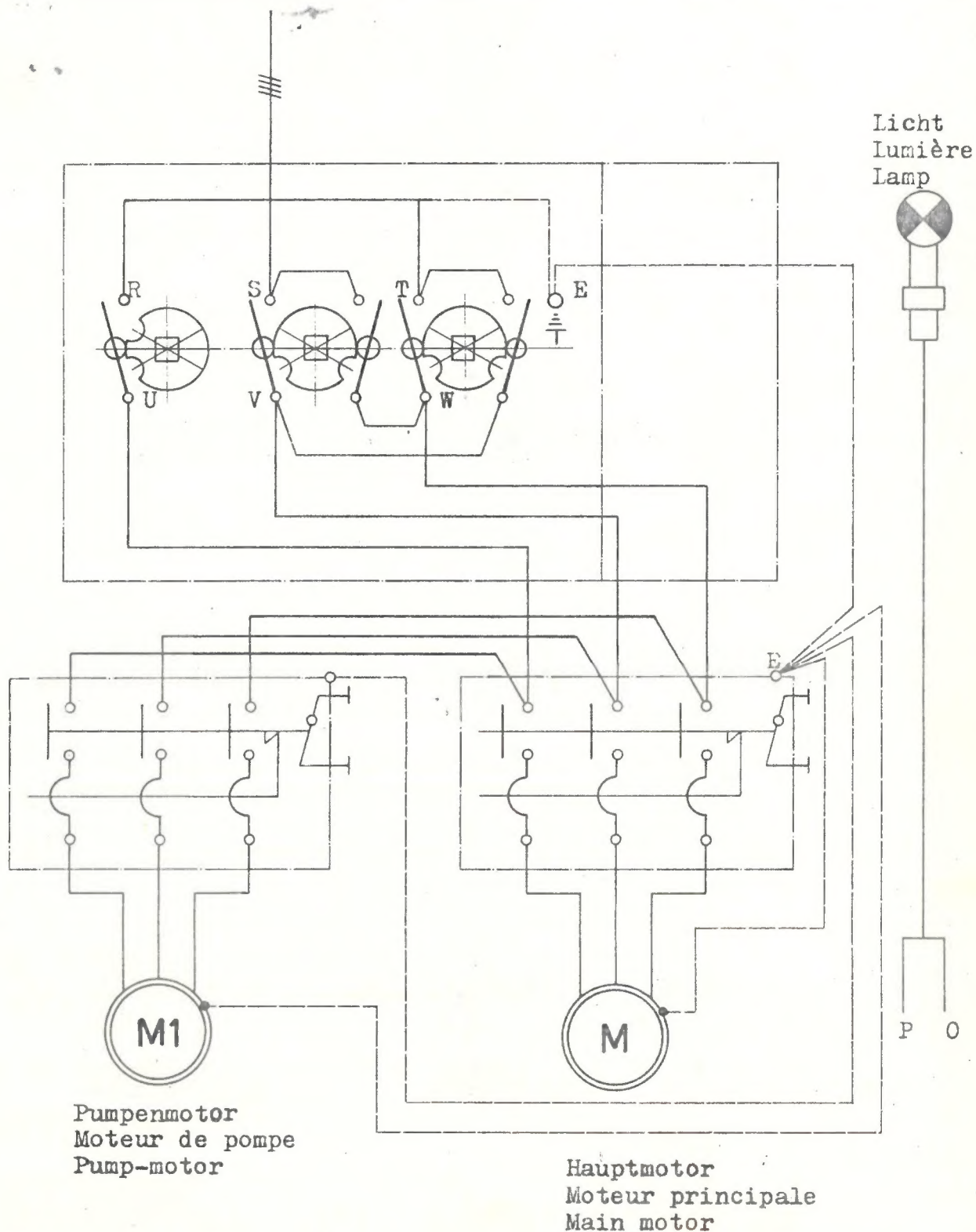
7.71.01.01

Schema des Motorschutzschalters zu 150-A, 175-A, 175-AR

Schéma de l'interrupteur de protection pour 150-A, 175-A, 175-AR

Schema of the thermal overload starter for 150-A, 175-A, 175-AR

Verwendet für:



150-A und 175-A , 175-AR	M	=	550 W	(0,75 PS)
150-A und 175-A , 175-AR	M1	=	75 W	(0,10 PS)
150-A und 175-A , 175-AR	L	=	40 VA	

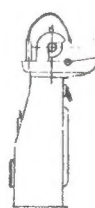
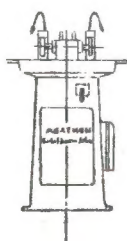
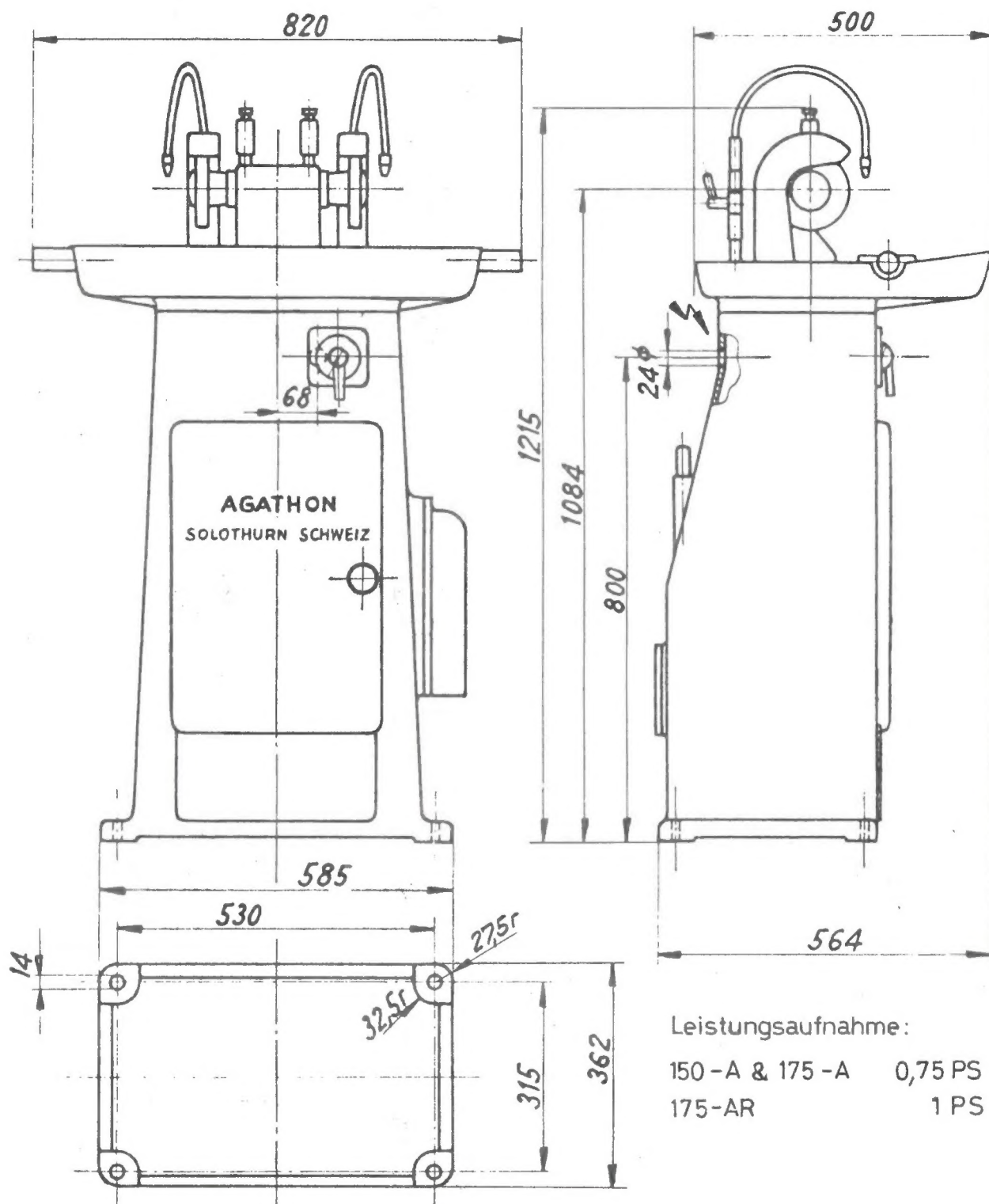
Ersatz für: 7.71.01.00

Ausf. Dat: 3.6.66 Vis: *2.7.71*
Interne Nr.: 270

AGATHON A.-G.
MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

7.71.01.01

Schleif- & Läppmaschine Type 150A, 175A, 175AR



Maßstab 1:50

Ersatz für: 520V

Aust: Dat: 11.9.61 Vis: *h*
 Maßstab: 1:10

AGATHON A.-G.
 MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

7.73.00.10

ATTACHMENT FOR GRINDING STRAIGHT CHIP GROOVES WITH SUITABLE RADII
FOR BREAKING OR ROLLING THE CHIPS AS PRODUCED

On the machine 175 - A chip breaker grooves can be produced on all tools as shown in Fig. 1 and 2 provided that both spindle inserts are ordered.

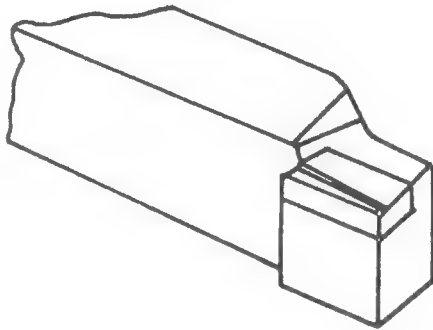


Fig. 1

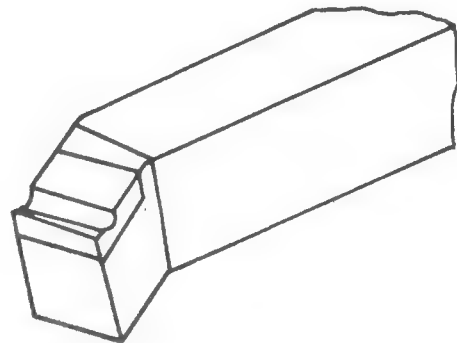


Fig. 2

Important: Chip groove grinding requires care. The grinding pressure on the diamond wheel must not be too great.

Diamond grinding wheel:

The chip groove grinding wheels should not be less than 90 mm in diameter and not more than 100 mm. The thickness of the wheel depends on the greatest width of chip breaker groove that has to be ground. In general, wheels 5 mm thick are employed. The diamond chip-groove grinding wheel should always be of very high concentration.

Setting the variable chip run-off radius:

The clamped tool is moved by means of the lever arm on the periphery of the chip groove grinding wheel. The size of the run-off radius is a function of the inclined position of the attachment to the chip groove grinding wheel and its diameter. In other words: the greater the inclination of the attachment with respect to the grinding wheel, the greater is the run-off radius of the chip groove. Set attachment by proceeding as follows.

1. Insert the attachment into its holder.

2. Fix in the attachment the corresponding holder for lathe tools with cross-section up to 30 x 30 mm with maximum chip range of 35 mm, or the holder for tools of over 30 x 30 to 50 x 60 mm cross-section with maximum chip range of 65 mm.

3. Depending on the shape of the tool, turn the large or small insert holder into the corresponding position. If necessary also the swivel piece can be inserted reversed, thus still considerably increases the range of clamping possibilities.

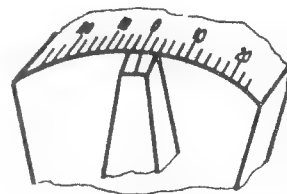
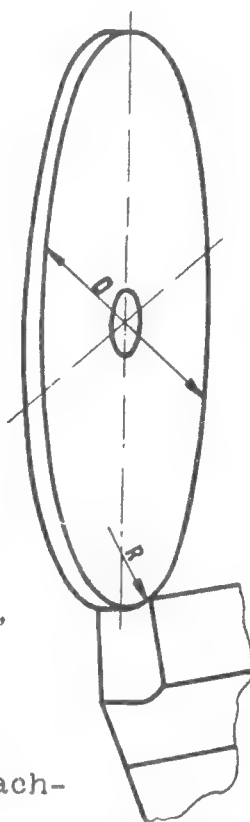
4. Now set the four scales on attachment and machine as follows:

I	Chip angle a	Range: $102^{\circ} - 0^{\circ} - 62^{\circ}$
II	Setting angle b	Range: $0^{\circ} - 90^{\circ} - 0^{\circ} - 90^{\circ} - 0^{\circ}$ ($=360^{\circ}$)
III	Inclination angle c	Range: $22^{\circ} - 0^{\circ} - 22^{\circ}$
IV	Setting of the run-off radius	Range: $26^{\circ} - 0^{\circ} - 26^{\circ}$

See Fig. 3 and 4, also the table.

Incline the holder with the attachment so far to the right or the left, depending on space available, by as many degrees as necessary to give the chip groove a definite radius.

- Now move the tool up and down at the periphery of the chip groove grinding wheel and set it at the suitable grinding height.
- The width B of the chip groove is set by operating the micrometer fine adjustment with the left hand.
- Now, before grinding the chip groove, make sure that travel and depth stops are fixed.
- Then grind the desired chip groove by and down movement of the tool by means of the lever arm, with successive adjustments of the depth stop with the right hand.



R	Setting angle	
1/32"	5°	30'
3/64"	6°	40'
1/16"	7°	40'
5/64"	8°	40'
3/32"	9°	30'
1/8"	11°	5'
5/32"	12°	25'
3/16"	13°	40'

9. Direct the jet of coolant from above on to the tool to be ground
10. For lengthening the service life of the tools without adversely affecting the edge strength of the cutting edges, a small negative phase has to be ground, as follows:
 - I. Put back the chip angle scale a) of 0° , resp. up to 3° negative. (See drawing angle a 1)
 - II. By slight correction of the inclination angle scale c , grind a wide parallel phase of $0,1 - 0,3$ mm
11. After this process exchange the chip groove grinding attachment with the corresponding support.
12. Set the tool into the support and grind, resp. lapp on the free angle a small phase of $0,5 - 1$ mm.
13. Exchange the support with the flat table and attach it laterally to the grinding wheel, so that the radius can be ground by hand, resp. lapped.

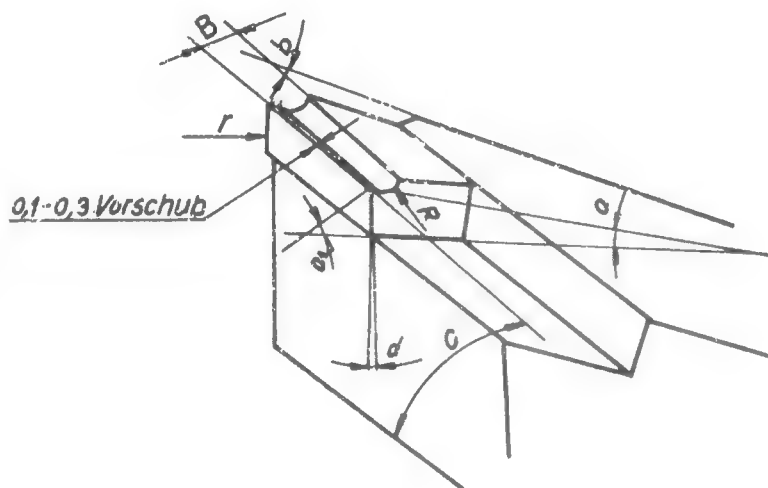
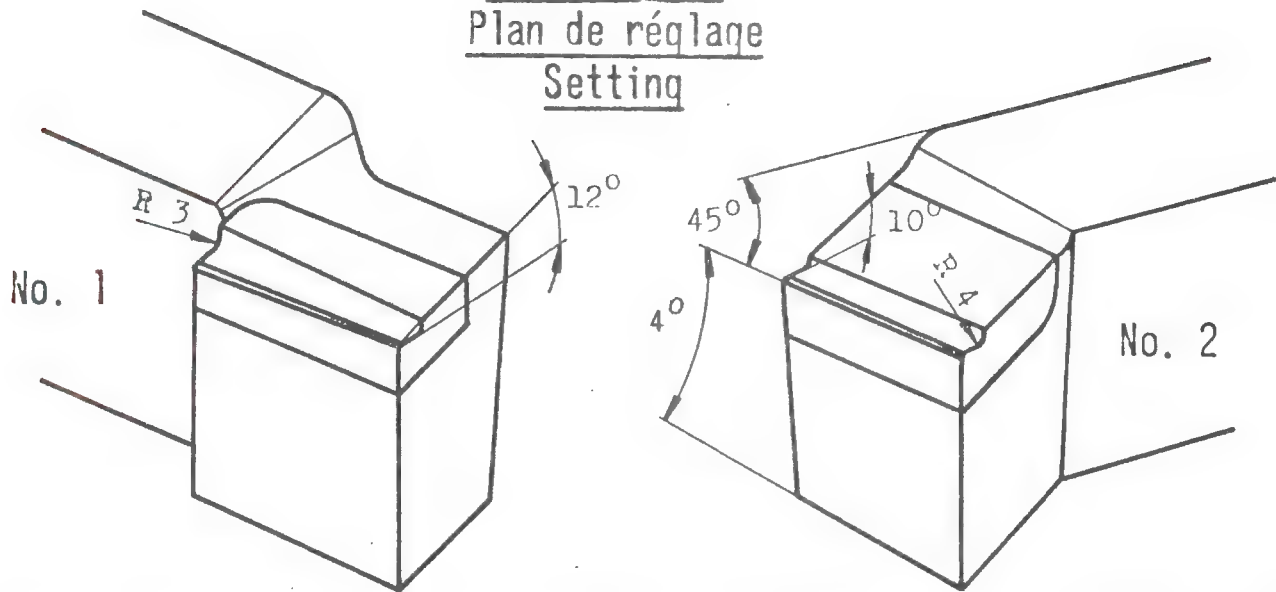
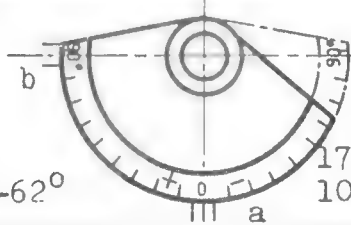
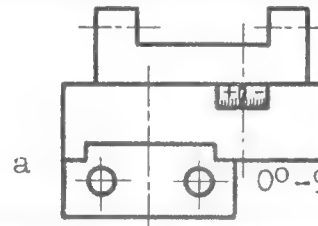
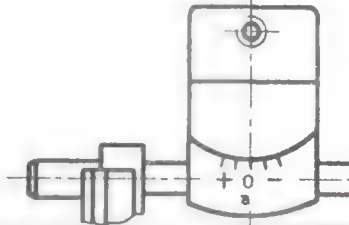

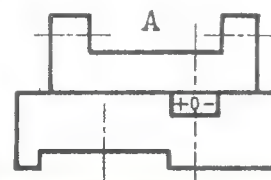
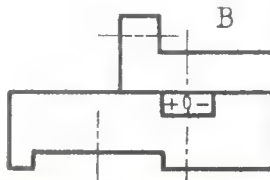


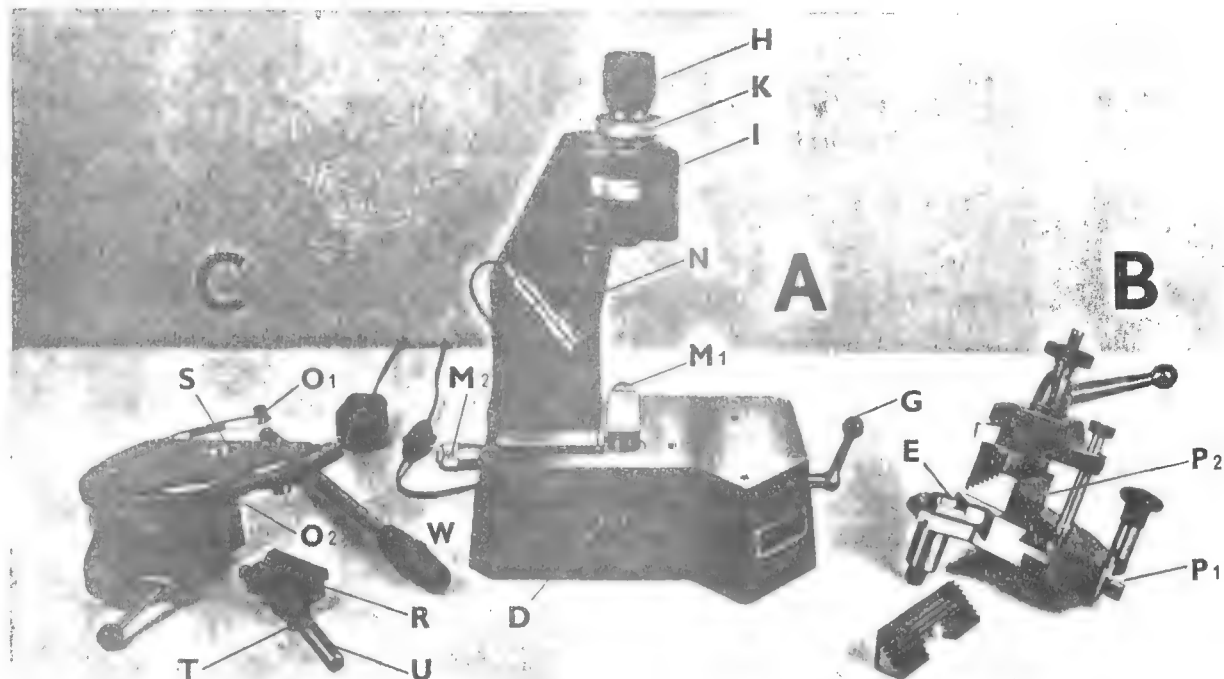
Fig. 5

Einstellplan
Plan de réglage
Setting



No. 1		Skala	Lecture	Scale	No. 2	
- a	12°	I	 <p>175-A: 102°-0°-62°</p> <p>175-C: 106°-0°-106°</p>	+ a	10°	
	0°	II	 <p>0°-90°-0°-90° (360°)</p>	+	45°	
a	0°	III	 <p>22°-0°-22°</p>	+ a	4°	
+	10°40'	IV	 <p>175-A: 26°-0°-26°</p> <p>175-C: 30°-0°-30°</p> <p>$\phi D = 90 \text{ mm}$</p>	-	12°25'	
A		 			B	

Operating Instructions
for the Precision Radius Grinding Device for
AGATHON Grinding and Lapping Machines, Type 150-A, 175-A



The device consists of the setting table -A-, the tool clamping plate -B- and the grinding table -C-.

The setting table -A- serves for the microscopic centering of the tool to be ground.

On the clamping plate -B- the tool is held firmly in its position with respect to the swiveling axis.

The grinding table -C- with the centre bush is mounted on the sliding shaft system of the machine.

For mounting the grinding table -C-, the adjusting shaft (\varnothing 14 mm) must be removed. Then the clamping slide -R- is introduced and fixed tight with the lever -U-. The lever -U- is used to tighten and to slacken by reversing the pawl -T-.

For protecting the paint and the grinding table -C-, an oil-resistant rubber slab is supplied, which is laid into the machine casing under the sliding shaft.

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AGATHON A.-G.
MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

Interne Nr:

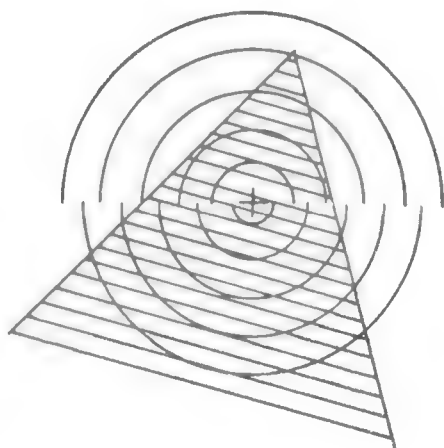
125/24-1e

The tool is generally clamped in such a way that its cutting edge is parallel to one of the straight outer edges of the clamping plate. The toothed wedge-blocks are set approximately to a height depending on the cross-section of the shank. Large tools may be clamped directly on the table, the toothed wedge-block being then swung out laterally to the tool.

Manipulating the microscope

Adjust the tool roughly under the microscope and clamp it. Direct the pencil of light rays from the lighting source -N- onto the green centering plate -E- and not onto the cutting edge of the tool.

Adjust the eyepiece -H- so that the semicircles of the graticule appear sharp when viewed normally. After that, adjust the focal distance with the knurled nut -I-. By means of the knurled nut -K-, the graticule can be rotated about its axis.



Field of view of the eyepiece

The pin under the tool clamping plate -B-, around which the tool radius grinding, is slidably connected to the clamping plate. Whilst the swiveling pin lies stationary in the bore of the setting table -A-, after reversing the clamping lever -D- to "L" (loose) the clamping plate can be moved in two directions by means of the micrometer screw -M1- and -M2- until the cutting edges of the tool become tangents to those circles of the graticule which correspond to the desired radius (see illustration)

Practically, however, the two cutting edges are adjusted beyond the desired dimension by 3 to 5/100 mm, in order that also the sides may be ground neatly. After this adjusting, the clamping lever -D- is changed over to "F" (tight), and then the swiveling pin is again rigidly connected to the clamping plate.

With the eccentric lever -G-, the tool clamping plate is raised from the setting table and brought onto the grinding table of the machine.

The socket -S- in the grinding table, which takes the swiveling pin of the tool clamping plate, must be slightly lubricated from time to time with a good ball-bearing grease.

The angle through which the tool clamping plate must be swiveled is set with the adjustable stop-bolts -01- and -02- and readjusted with fine feeds -P1- and -P2-. The fine feed of the tool to the diamond grinding wheel is effected by means of the micrometer drum on the sliding shaft. The dimension is reached when radius and main and secondary cutting edges have been ground neat without any transition, in other words, when the excess dimension of 3 to 5/100 mm set on the main and secondary cutting edges has been ground away.

The nearer the tool is brought to the grinding wheel by the sliding-shaft fine feed, the smaller will the radius become. If the radius has to be kept to an exact dimension, it must be checked afterwards under the microscope.

The rocker lever -W- serves for producing neat transitions from the radius to the sides. The clearance angle remains constant: it can be adjusted up to 14° . Possibly it may be necessary to make a change of grinding wheels for rough and finished grinding. In the case of lapping wheels of medium grit 200-300 or D 70 to D 30 (My), the radius is as a rule only fine ground, not rough.

The rocker lever is to be set instead of the rest, onto the normal sliding piece, which is firmly clamped. The to-and-fro movement required for grinding main and secondary cutting edges is effected with this lever.

AGATHON LTD. MACHINE-TOOL MANUFACTURERS

End Mill Grinding Attachment with Axial Feed

The end mill grinding attachment comprises two main parts, a quill and a quill holder which is mounted on to the attachment holder on the machine. The quill holder is provided with a dividing unit and setting pawl and can be swivelled $\pm 30^\circ$. (Note: Angular distortion possible).

The quill is retained in the holder with screws, so that it can be easily removed from the holder, without unclamping the workpiece, for checking purposes. The quill carries a spindle which, through a nut with 2 mm (.080") pitch thread, has an axial movement of 6 mm (.240"). A 4-position dividing disc is screwed on to the rear of the spindle.

Applications

1. Cylindrical or taper grinding (on the face of the wheel).
2. Facet grinding.
3. Step grinding - axial adjustment with the nut.
4. Relief grinding of right hand cutting cutters (quill with left hand thread). For left hand cutting cutters a quill is available with right hand thread. Relief grinding is achieved by engaging the pawl which locks the dividing disc to the feed nut so combining the radial and axial movements.



SCHMIERANWEISUNG FÜR HARTMETALL-, SCHLEIF- UND LÄPP-MASCHINEN
TABLEAU DE LUBRIFICATION POUR MACHINES DE PRECISION POUR L'AFFUTAGE ET LE GLACAGE DES OUTILS
LUBRICATION CHART FOR TOOL GRINDING AND LAPPING MACHINES

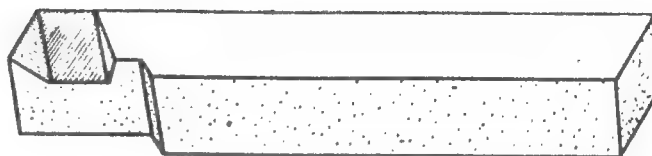
AGATHON A.G.
MASCHINENFABRIK
4500 SOLOTHURN / SOLEURE
(Schweiz / Suisse / Switzerland)

Werkzeugschleifmaschinen Typen 125 S, 125 SV, 125 SE, 125 SEV	Rectifieuses d'outillage Types 125 S, 125 SV, 125 SE, 125 SEV	Tool grinding machines Types 125 S, 125 SV, 125 SE, 125 SEV	Viskosität/Visc. °E/50°C cSt/50°C		Mobil	ANTAR	BP	Esso	SHELL
Schleifspindel	Broche	Grinding Spindle	3,0	21	DTE 24	Misola AH	Energol HP 10	Nuto H 44	Turbo Oil 27
Hydraulik (wenn vorhanden)	Hydraulique (si présent)	Hydraulic (if present)	5,1	38	DTE 26	Misola BH	Energol HP 20	Nuto H 54	Turbo Oil 33
Vertikalgleitbahn	Glissière verticale	Slide ways vertical	5,3	40	Vactra Oil Nr. 2	Moglia B	Energol HP 20-C	Febis K 53	Tonna Oil 33
Kugellager, Rollenlager	Roulements à billes	Ball bearings			Mobilplex 47	Rolexa 2	Energrease HTB 2	Beacon 2	Darina Grease 2
Typen Minor 150 A, 175 A, 175 AR	Types Minor 150 A, 175 A, 175 AR	Types Minor 150 A, 175 A, 175 AR							
Schleifspindel	Broche	Grinding spindle	1,6	7	Velocite Oil Nr. 6	Spez. Continu 3A	Energol HP 3	Spinesso 34	Tellus Oil 13
Drehzapfenlager	Palier pour pivot de rotation	Pivot bearing	5,3	40	Vactra Oil Nr. 2	Moglia B	Energol HP 20-C	Febis K 53	Tonna Oil 33
Allgemeine Schmierung	Graissage général	General lubrication	5,3	40	Vactra Oil Nr. 2	Moglia B	Energol HP 20-C	Febis K 53	Tonna Oil 33
Walzen- und Kugelführungen,	Glissières à galets, roulements,	Roller guides, ball bearings,							
Kugellager, Fettschmierstellen	graisage à la graisse	grease lubrication			Mobilplex 47	Rolexa 2	Energrease HTB 2	Beacon 2	Darina Grease 2
Typen 175 DE, 220 P, TIPMATIC, 250 PA	Types 175 DE, 220 P, TIPMATIC, 250 PA	Types 175 DE, 220 P TIPMATIC, 250 PA							
Oszillationsführung (Kugelführung)	Guidage d'oscillation (à billes)	Oscillation guide (ball bearings)	2,0	11,4	Mobilplex 47	Rolexa 2	Energrease HTB 2	Beacon 2	Darina Grease 2
Hydraulik-Aggregat	Système hydraulique	Hydraulic system			DTE 11				
Schleifspindel	Broche	Grinding Spindle	3,0	21	DTE 24	Misola AH	Energol HP 10	Nuto H 44	Turbo Oil 27
Hydraulik-Zylinder	Cylindre hydraulique	Hydraulic cylinder	5,1	38	DTE 26	Misola BH	Energol HP 20	Nuto H 54	Turbo Oil 33
Führungen (Nadelführungen)	Guides (Guides à aiguilles)	Guides (needle guides)							
Hydropneumatic	Valve pneumatique	Air valve	2,9	20	Mobilarma 522				
Reduktionsgetriebe	Réducteur	Reduction gear	5,1	38	Mobilgear 626	Misola BH	Energol GR 125-EP	Pen-o-led EP 1	Macoma Oil 37
Schleifkopf (Kugellager)	Poupée (roulements à billes)	Grinding head (ball bearings)			Mobilplex 47	Rolexa 2	Energrease HTB 2	Beacon 2	Darina Grease 2
Walzenführung	Glissière à galets	Roller guide			Mobilplex 47	Rolexa 2	Energrease HTB 2	Beacon 2	Darina Grease 2
Drehzapfenlager	Palier pour pivot de rotation	Pivot bearing	5,3	40	Vactra Oil Nr. 2	Moglia B	Energol HP 20-C	Febis K 53	Tonna Oil 33
Allgemeine Schmierung	Graissage général	General lubrication	5,3	40	Vactra Oil Nr. 2	Moglia B	Energol HP 20-C	Febis K 53	Tonna Oil 33
Spitzenlose Schleifmaschine Type 150 SL	Rectifieuse sans centre Type 150 SL	Centerless grinding machine Typ 150 SL							
Steuerluft (Ölnebel)	Air de commande (brouillard d'huile)	Control air (Oilmist)	2,9	20	Mobilarma 522				
Schleifspindel (Ölnebel)	Broche (brouillard d'huile)	Grinding spindle (Oilmist)	3,0	21	DTE 24	Misola AH	Energol HP 10	Nuto H 44	Turbo Oil 27
Einstechapparat	Appareil de plongée	Plunge grinding attachment	3,0	21	Vactra Oil Nr. 1	Moglia A	Energol HP 10-C	Febis K 43	Tonna Oil 27
Abdrehzylinder	Cylindre de dressage	Dressing cylinder	5,1	38	DTE 26	Misola BH	Energol HP 20	Nuto H 54	Turbo Oil 33
Schwalbenschwanzführung	Queue d'aronde	V-guide	5,3	40	Vactra Oil Nr. 2	Moglia B	Energol HP 20-C	Febis K 53	Tonna Oil 33
Stanzblöcke	Blocs à colonnes	Die sets							
Ausführung G Gussführung	Exécution G Guidage en fonte	Execution G Cast guide	5,3	40	Vactra Oil Nr. 2	Moglia B	Energol HP 20-C	Febis K 53	Tonna Oil 33
Ausführung S Stahlführung	Exécution S Guide d'acier	Execution S Steel guide	5,3	40	Vactra Oil Nr. 2	Moglia B	Energol HP 20-C	Febis K 53	Tonna Oil 33
Ausführung K Kugelführung	Exécution K Guide à billes	Execution K Ball guide			Mobilplex 47	Rolexa 2	Energrease HTB 2	Beacon 2	Darina Grease 2

Unsere Maschinen werden im Werk mit MOBIL Produkten geschmiert / A leur départ, nos machines sont graissées avec MOBIL / MOBIL Lubricants are used for the initial fill of our machines.

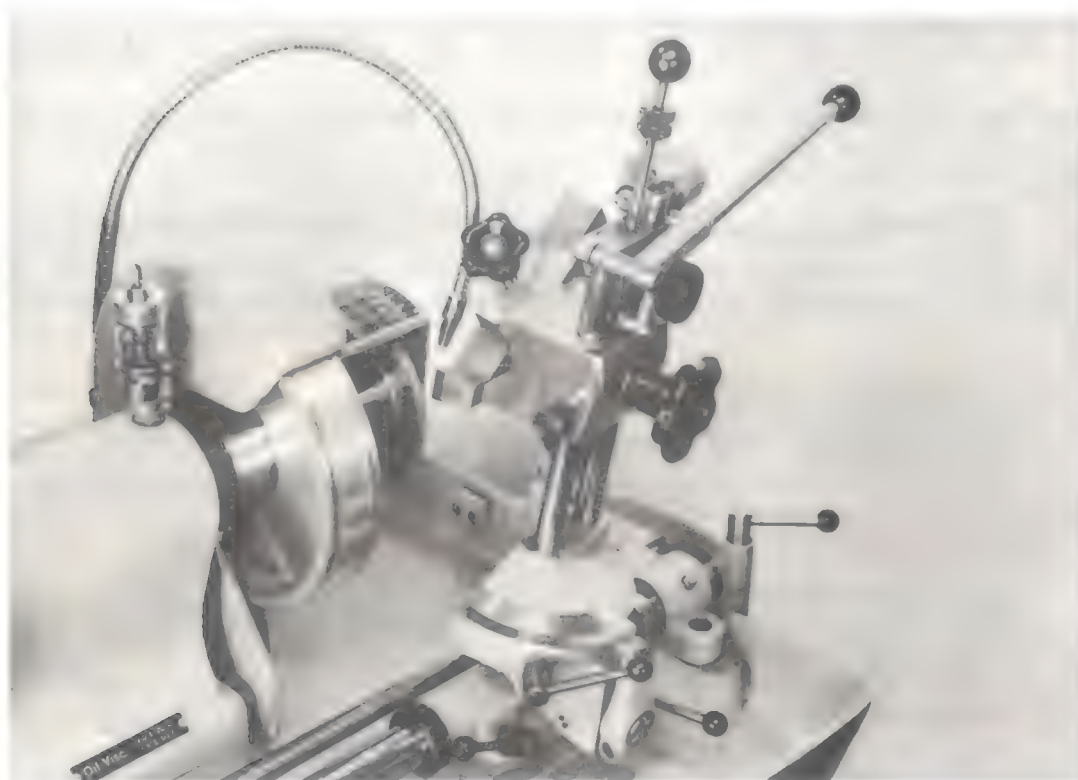


Tangential turning tool



A tangential turning tool is a tool with two cutting edges which can be used for both parting and traverse cutting.

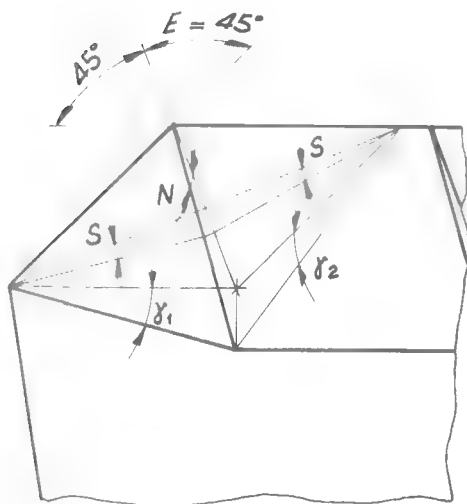
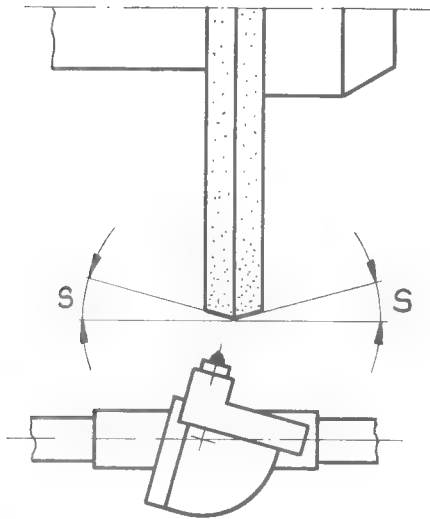
The conventional tangential tool is ground on the AGATHON 175-A, 175-DIA and 175-CBN machines, using the chip-breaker grinding attachment and a corresponding holder.



Settings are described below for tools with equal and unequal angles, i.e. with varying cutting rakes.

1. Tangential tool with equal angles :

- 1.1 The grinding wheel is dressed to the form shown by sliding the diamond holder backwards and forwards along the support which is inclined at angle S .



- 1.2 As shown on the adjacent sketch:

Grinding wheel ΔS =

Inclination ΔN

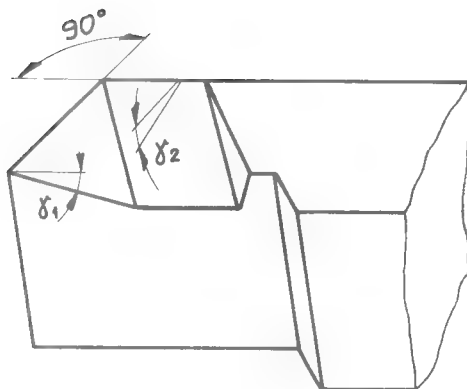
- 1.3 The following conditions exist :

$$\gamma_1 = \gamma_2 = \gamma$$

Setting angle $E = 45^\circ$

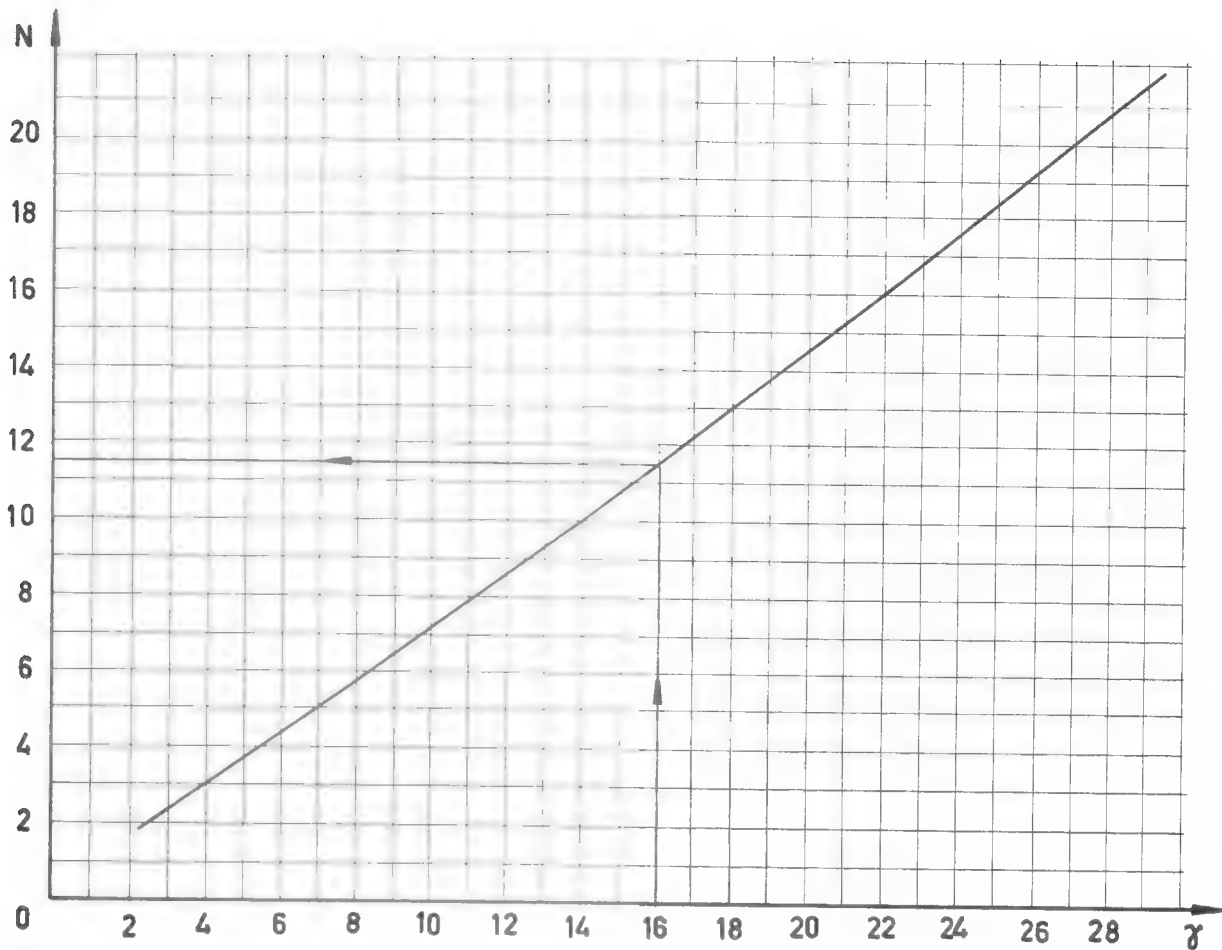
Angle of inclination N is calculated from :

$$\tan N = \frac{\tan \gamma}{\sqrt{2}} = \underline{\underline{.707 \tan \gamma}}$$



Given angle γ , angle N can be read off graph 1

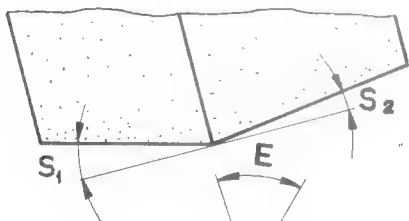
Table 1



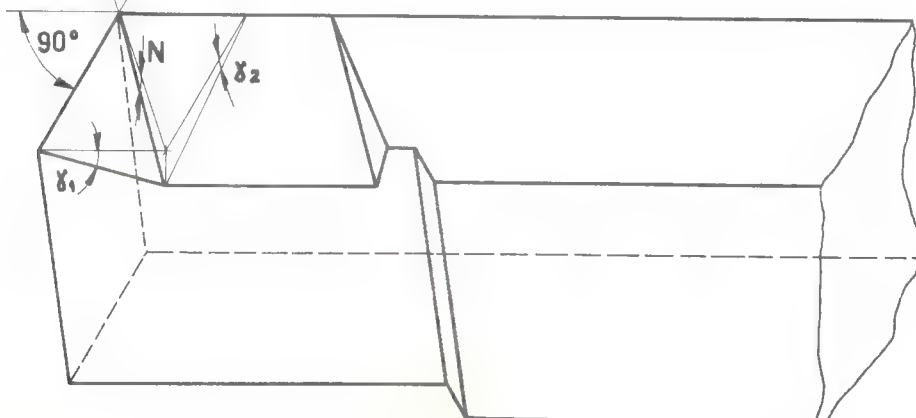
The chip-breaker grinding attachment is set according to table 2 (equal angles).

2. Tangential tool with unequal angles :

On this type of tool the setting angle E , angle of inclination N and grinding wheel angle S are functions of the two rake angles.



The following formulae are used to calculate the various angles.



$$\text{Setting angle } E \quad \tan E = \frac{\tan \gamma^2}{\tan \gamma^1} = \underline{\underline{\tan \gamma^2 \cdot \cot \gamma^1}}$$

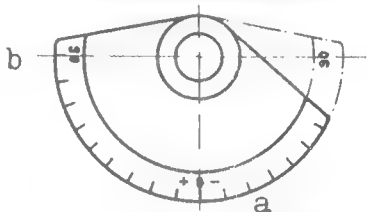
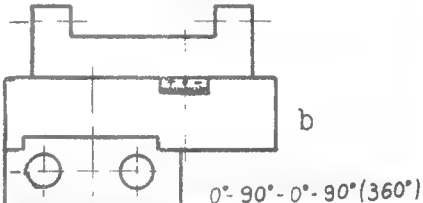
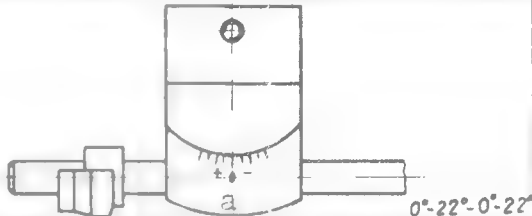

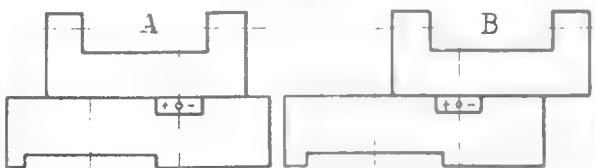
$$\text{Inclination angle } N \quad \tan N = \frac{\tan \gamma^2}{\sqrt{\tan^2 E + 1}} = \underline{\underline{\tan \gamma^2 \cdot \cos E}}$$

$$\text{Grinding wheel angle } S_1 \quad \tan S_1 = \frac{\cos E \cdot \tan N}{\sin E} = \underline{\underline{\tan N \cdot \cot E}}$$

$$\text{Grinding wheel angle } S_2 \quad \tan S_2 = \frac{\cos E \cdot \tan N}{\cos E \cdot \tan (90-E)} = \underline{\underline{\tan N \cdot \tan E}}$$

The chip-breaker grinding attachment is set according to table 2 (unequal angles).

Table 2

Equal angles			unequal angles	
a	0°		a	0°
a	+45°		a	+E°
a	-N°		a	-N°
	0°			0°
A or B			A or B	



Circular Form Tool Grinding Attachment



Technical data

Application:

Circular form tools

Diameter

min. 1.18" (30 mm) - max. 3.35" (85 mm)

Max. width

2.16" (55 mm)

360° swivelling

See reverse side for operating instructions!

Code No.:

2.00.30.41

Price:

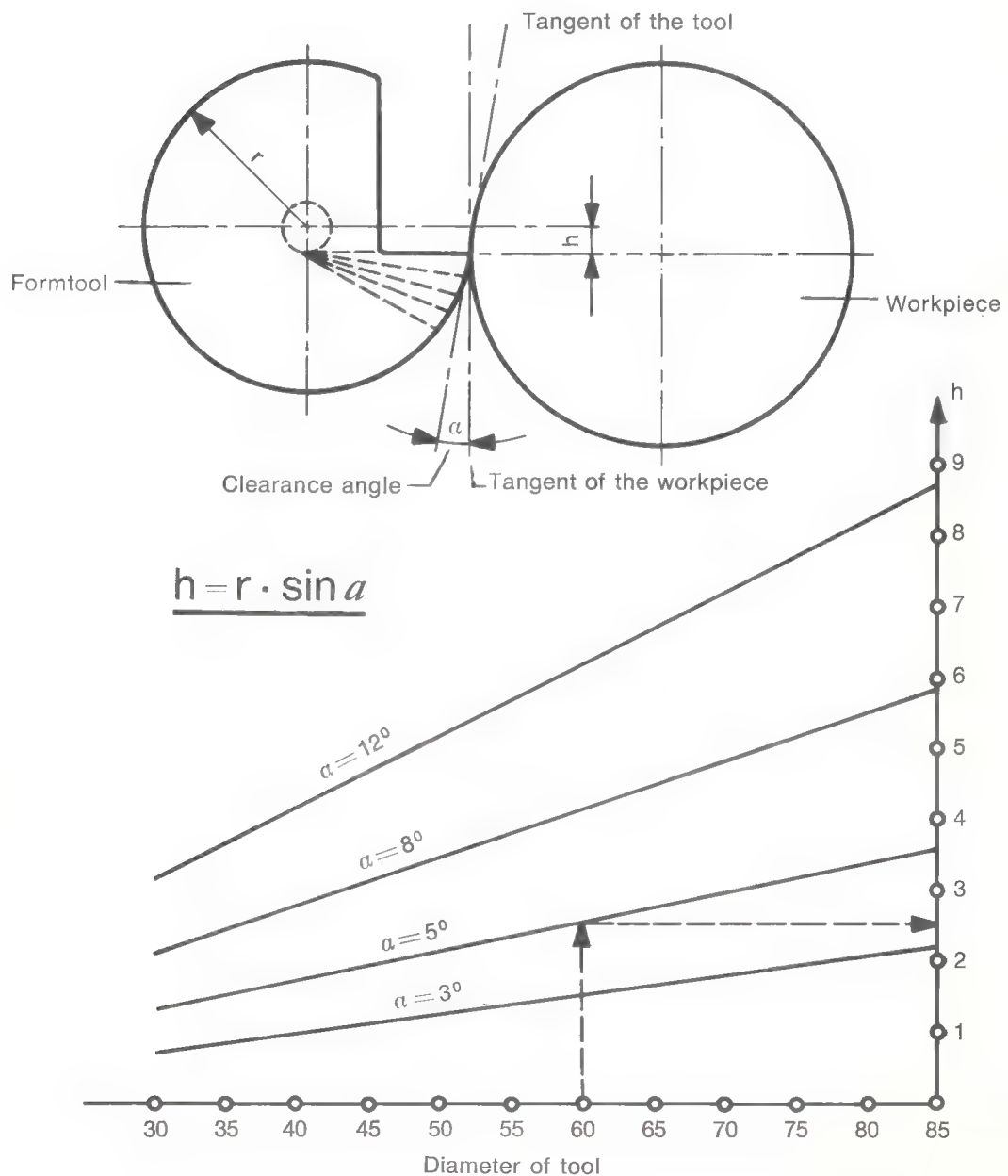
AGATHON LTD. - MACHINE - TOOL MANUFACTURERS - CH 4500 SOLOTHURN - SWITZERLAND
TEL. (065) 37 11 31

TELEX 3 41 61

Circular Form Tool Grinding Attachment

1. Grinding the form tool:

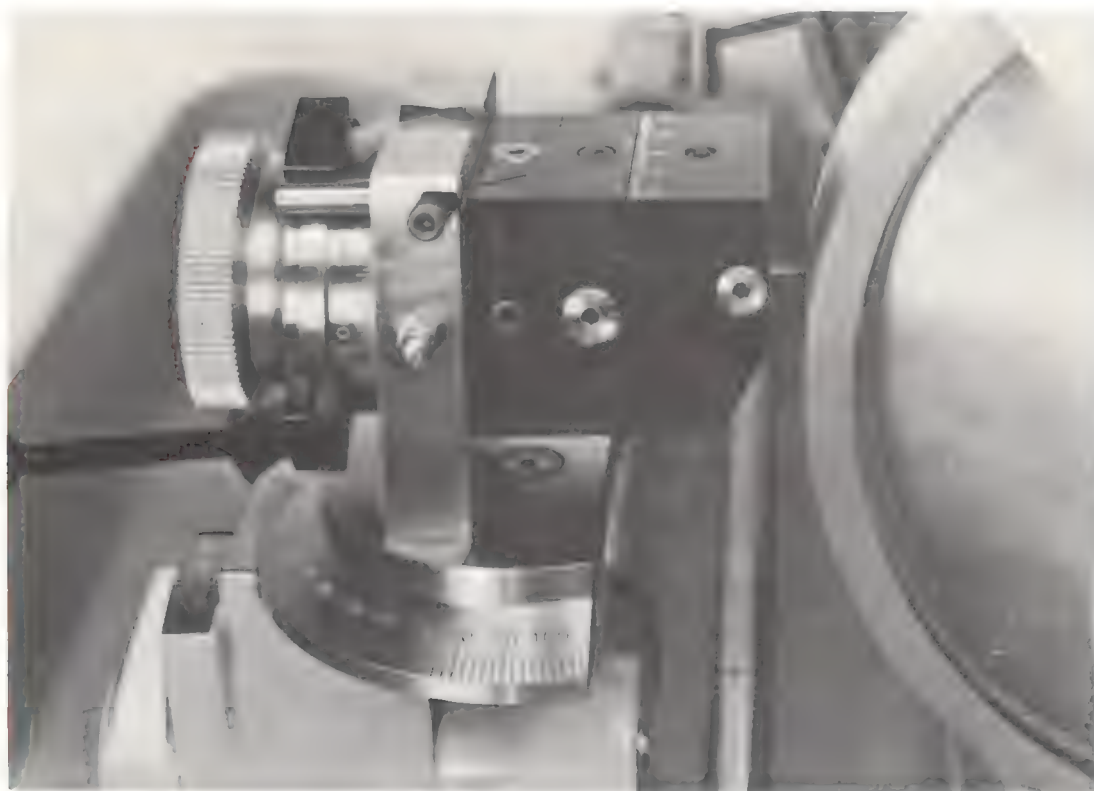
- 1.1 Secure the form tool to the radially adjustable spigot with the aid of the centering screw.
- 1.2 Slide the attachment towards the grinding wheel until the cut-out on the setting disc contacts the wheel. No turn the setting disc clockwise through 90°.
- 1.3 The axis of the tool must not coincide with the axis of the workpiece to be machined. The cutting edge must be offset by distance h . The value h , calculated as shown below, should be set on the slide bar micrometer.





Convex radius grinding attachment for ESCO round and triangular tool-bits

with compound slides, 2 adjustable angular stops and swivelling adaptor plate.



Technical data

Application:

ESCO-round and triangular tool-bits

Tool bit diameter

.24" (6 mm)

Vertical adjustment

± .4" (10 mm)

Horizontal adjustment

± .4" (10 mm)

Swivelling

360°

See reverse side for operating instructions

Code No.

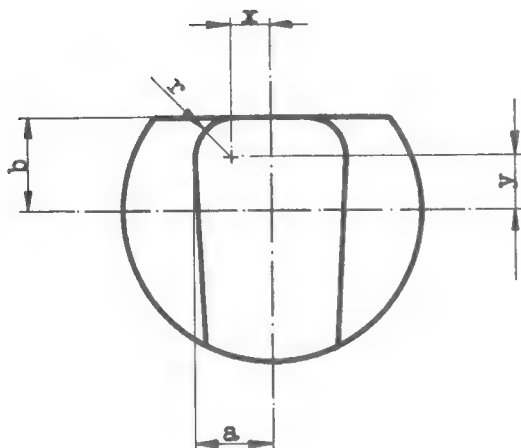
3.00.40.51

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TEL. (065) 37 11 31 TELEX 3 41 61

Convex radius grinding attachment

1. Radius grinding:

- 1.1 Align the tool bit using the eccentric and clamp with the socket head screw. For triangular tools use the vee-insert for clamping.
- 1.2 with the aid of the drawing, calculate settings x and y and set the compound slides to these dimensions.



$$x = a - r$$

$$y = b - r$$

- 1.3 Set the angular stops to required values and set swivelling adaptor.
- 1.4 The radius is ground by approaching the tool to the wheel using the machine fine feed whilst, at the same time, swivelling the tool block between the two stops.

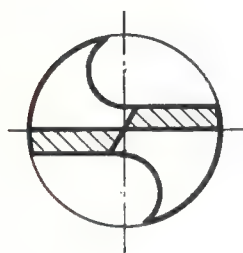
2. Cylindrical grinding:

- 2.1 Set the cross-slide to zero.
- 2.2 By simultaneously feeding the tool against the wheel and rotating the tool block, grind to diameter required.
- 2.3 Eccentric components can be ground by offsetting the cross-slide to the appropriate amount.

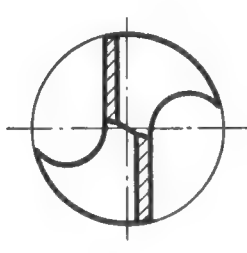


Spiral-Bohrerschleifeinrichtung **Dispositif à affûter les forets hélicoïdaux** **Grinding Device for Twist Drills**

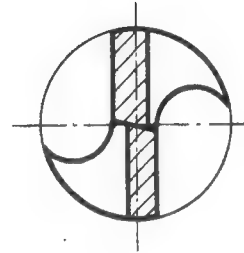
Aufgebaut auf Maschinentyp AGATHON 175-A
Pour montage sur machine AGATHON Type 175-A
For use on machine type AGATHON 175-A



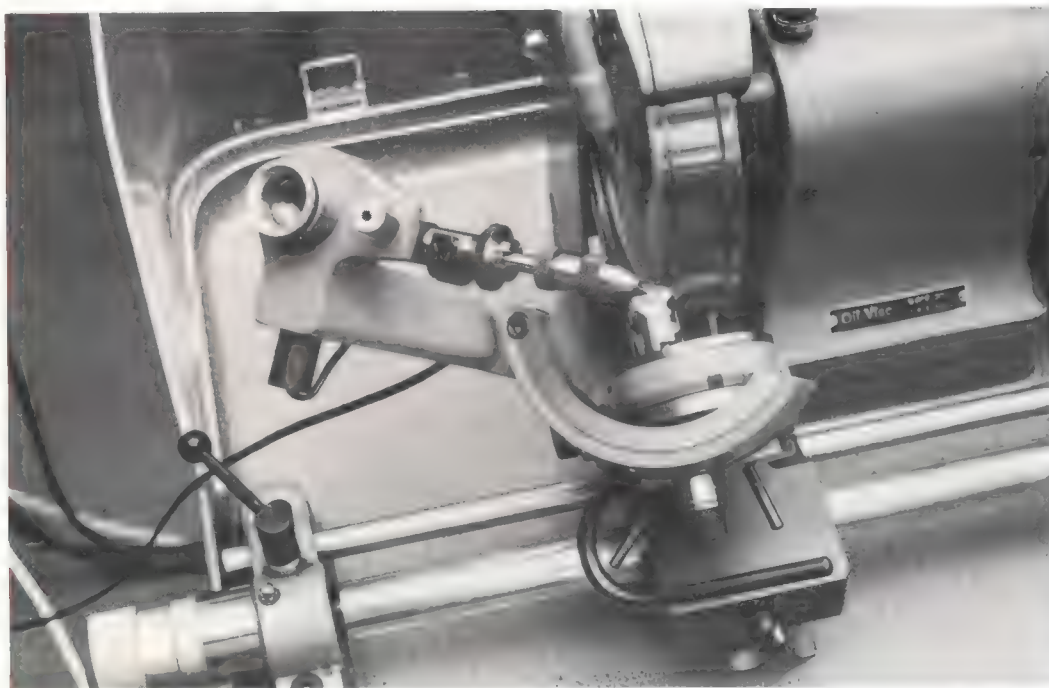
Richtiger Anschliff
Affûtage correct
Correct drill-point
clearance



Ungünstiger Anschliff
Affûtage défavorable
Unrecommendable drill-
point clearance



Schlechter Anschliff
Mauvais affûtage
Incorrect drill-point
clearance



Bitte wenden
Tourner s.v.p.
Please turn

TECHNISCHE DATEN
DATES TECHNIQUES
TECHNICAL DATA

Vier-Flächen-Anschliff an Hartmetall- und Schnellstahl-Spiralbohrern
L'affûtage à 4 faces aux forets hélicoidaux en métal dur et en acier rapide
Four-face-clearance on carbide and high speed steel twist drills

Arbeitsbereich:	Ø 0,5 – 6,3 mm =	Standardausführung
Capacité:		Exécution standard
Working range:	Ø .02" – .25"	Standard execution

Erweiterte Spanneinheit: 68.30.04	Ø 6,0 – 10,0 mm =	Zubehör
Dispositif spécial:		Accessoire
Extension clamping unit:	Ø .25" – 3.00 .40"	Attachment

Beleuchtete Optik:	6 V	inkl. Transformer
Eclairage de la loupe:		avec transformateur
Microscope with illumination:		with transformer

Spitzenwinkelbereich:	100 – 150°
Réglage de l'angle de pointe:	
Point angle range:	

Fasenfreiwinkel:	0 – 15°
Réglage de l'angle de dépouille:	
Lip relief:	

Sekundärer Freiwinkel:	30°
Réglage de l'angle de contre-dépouille:	
Secondary relief:	

Verkaufsposition: 2.00.93.00
Ordre No.:
Order No.:

Verkaufspreis:
Prix de vente:
Sales price:

Form. 666

AGATHON

PRECISION TOOL GRINDING AND LAPPING MACHINE

Type 150-A

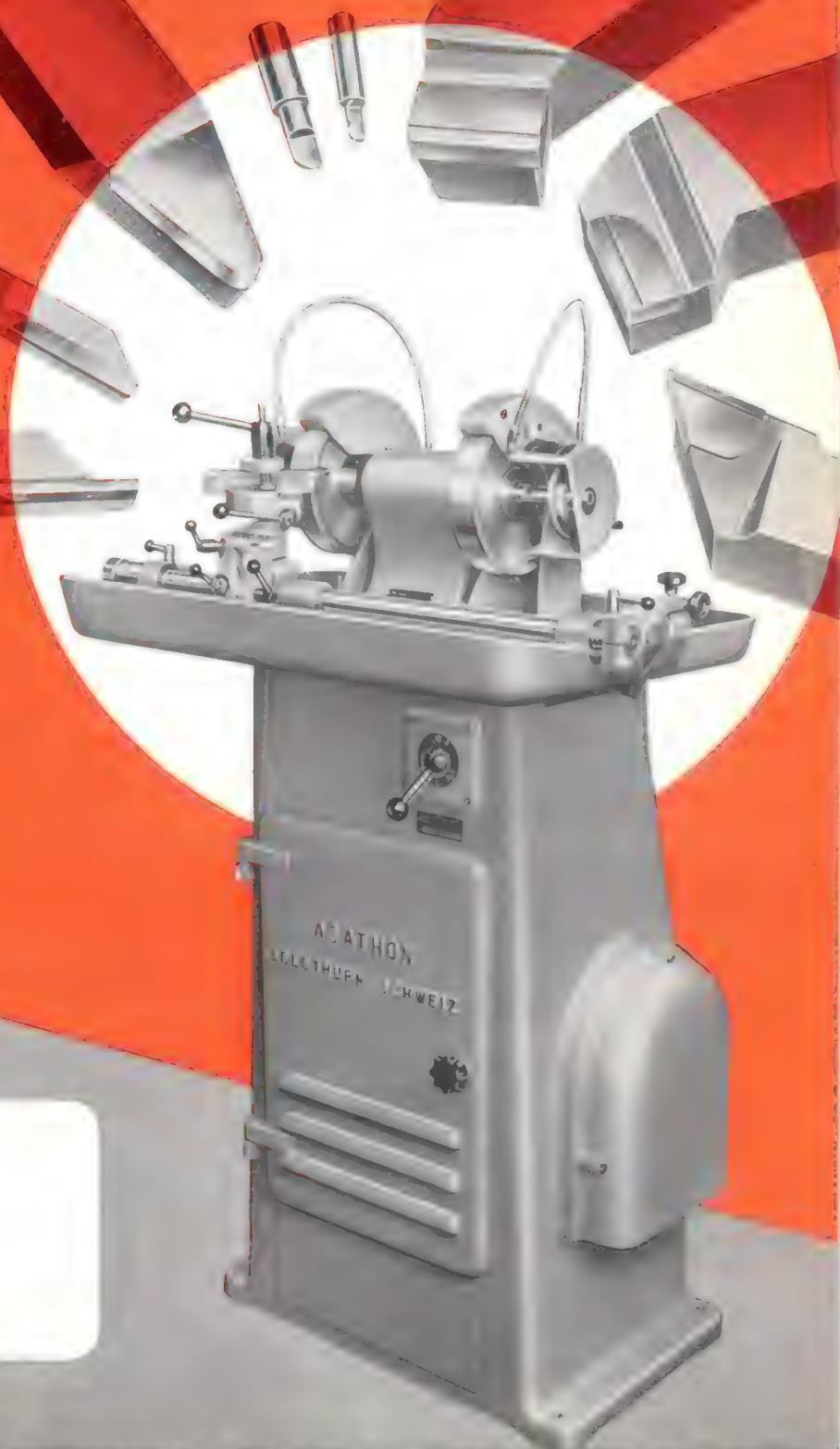
Grinding wheel diameter
6 in. (150 mm)
for tungsten carbide

Type 175-A

Grinding wheel diameter
7 in. (175 mm)
for tungsten carbide

Type 175-AR

Grinding wheel diameter
7 in. (175 mm)
for high speed steel



AGATHON LTD., MACHINE-TOOL MANUFACTURERS : SOLEURE : SWITZERLAND

Tools

To cut efficiently, tools must be properly ground, and if they are small precision tools or cemented-tungsten carbide tools, they must also be lapped.

No inaccuracy of freehand grinding

No loss of time entailed in selecting the correct grinding angles

by using the



Grinding

Method

Grinding and Lapping

on two double sided wheels of different grit without reclamping tool

Secure clamping of tool

Extremely accurate adjustment of toolholder to cutting angle

Fine infeed and feed by micrometer screw

Freedom from vibration in grinding and lapping wheels

Perfect cutting faces and edges

The toolholder allows the tool to be clamped in any conceivable angular position to a scale. For grinding, it is moved backwards and forwards across the face of the wheel with the right hand by feel, while the infeed is effected with a micrometer screw controlled by the left hand. After grinding it is moved along the slide bar (without reclamping the tool) to the lapping wheel, where lapping is then carried out in the same manner.

The jet of the coolant can be accurately directed on to the tool in any position by means of two flexible metallic tubes

Advantages:

Precision grinding

Short grinding time

Low wheel consumption

No reclamping of tool

Even wear on grinding and lapping wheels

Highly efficient cooling

The swivelling attachment holder is designed to take the standard tool rest and all attachments; it can be adjusted along the sliding shaft.



Design of AGATHON-Machines

The precision grinding spindle, nitrided, lapped and guided in best quality phosphor bronze bearings, ensures freedom from vibration.

The cast-iron frame and the various parts of the machine are of sturdy design. The driving motor, the electro suction pump and the coolant setting tank are located in the base.

All tool holders are easily changed with one turn.

Fitting a standard tool rest into the attachment holder.

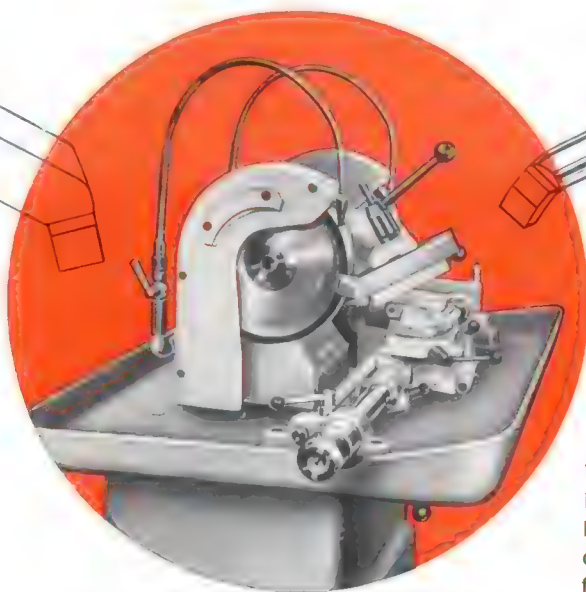


Specification of the machine

Grinding wheels: diameter	Type 150-A	Type 175-A
bore	6 in. (150 mm)	7 in. (175 mm)
Spindle head belt pulley diameter	.63 in. (16 mm)	.79 in. (20 mm)
Spindle speed	2.35 in. (60 mm)	2.35 in. (60 mm)
Shank size of tools to be ground up to	2500 r. p. m.	2500 r. p. m.
	1.26/1.26 in.	1.58/1.58 in.
	(32/32 mm)	(40/40 mm)
Space required by machine	33.5/24.4 in.	33.5/24.4 in.
	(850/620 mm)	(850/620 mm)
Spindle height	41.5 in. (1050 mm)	41.5 in. (1050 mm)
Power required: main motor/electro suction pump	0.55/0.1 kW	0.55/0.1 kW
Weight of machine net approx.	500 lbs. (225 kg)	520 lbs. (235 kg)
standard accessories gross approx.	690 lbs. (315 kg)	715 lbs. (325 kg)

Standard accessories for 150-A, 175-A and 175-AR

1 tool holder with clamping device, capable of being swung out for straight and cranked tools, shank cross section up to .6x.6 in. (15x15 mm) or 1 ditto for shank cross sections from .62x.63 in. (16x16 mm) to 1.6x1.6 in. (40x40 mm), 1 table for freehand grinding, 1 set of keys.



The tool holder with clamping device can be swung out for straight and cranked tools.

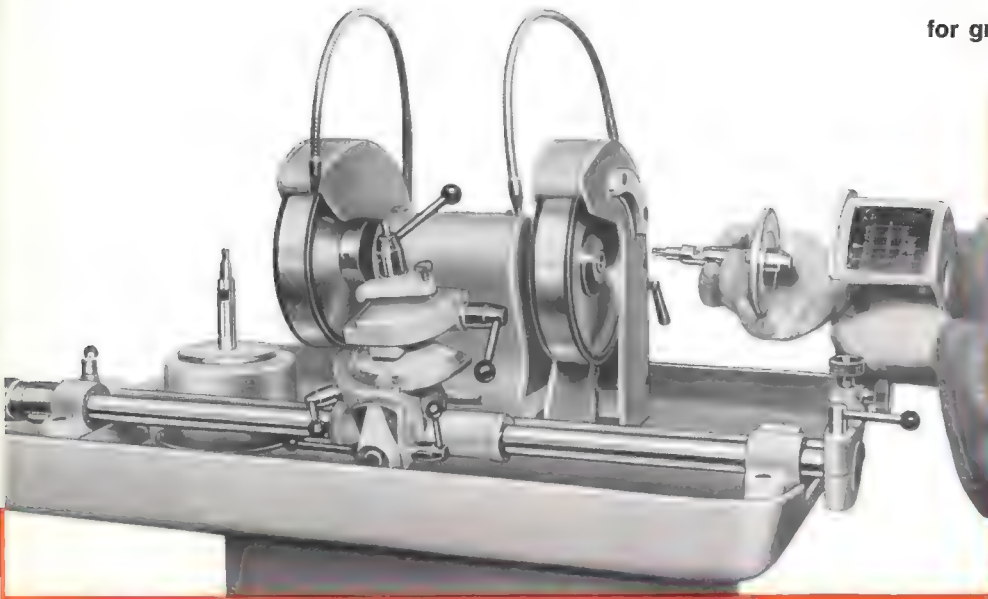
According to the crank the rest is brought into the best position for grinding by adjusting the swivel head. Not only tools with left or right-hand bends, but also many other tools that are difficult to grind can be ground accurately with ease and economy.

The value of the machine lies not only in its accuracy, but also in the fact that by using special attachments, the most difficult grinding operations can be performed (for example, grinding chip-breakers, grinding special tools, single and double tooth milling cutters, face-mills, etc.).

Special accessories

Special accessories

INSERTS FOR SPINDLE EXTENSIONS for grinding chip-breakers on 175-A machine



Owing to its heavy grinding spindle, the type 175-A machine is able to accommodate inserts which can be fitted at each end of the grinding spindle for chip-breaker wheels. If subsequent purchase of the chip-breaker attachment illustrated hereafter is envisaged, the inserts for extended spindles with guards should be ordered with the machine, if ever possible.

The extended spindle is used also for taking grinding wheels of widely differing forms, as required in the watch-making and auto turning industry.

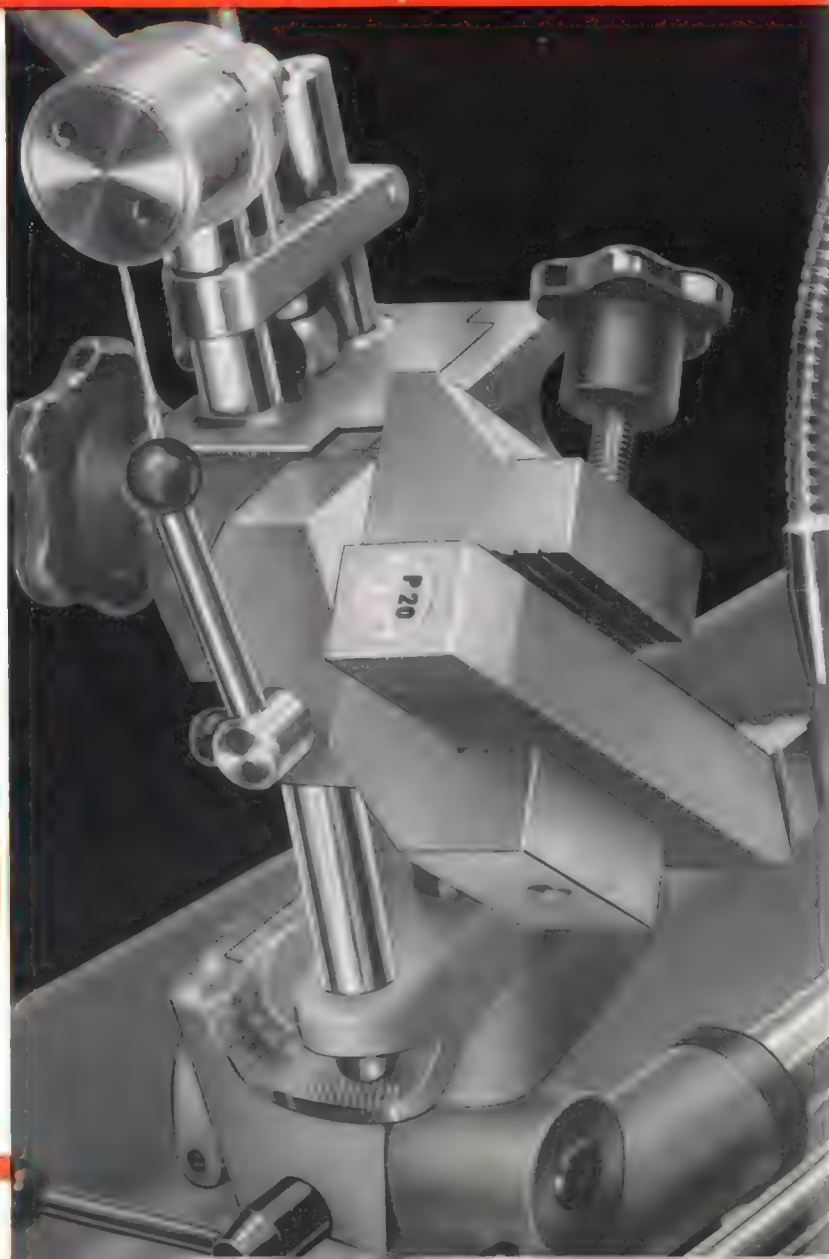
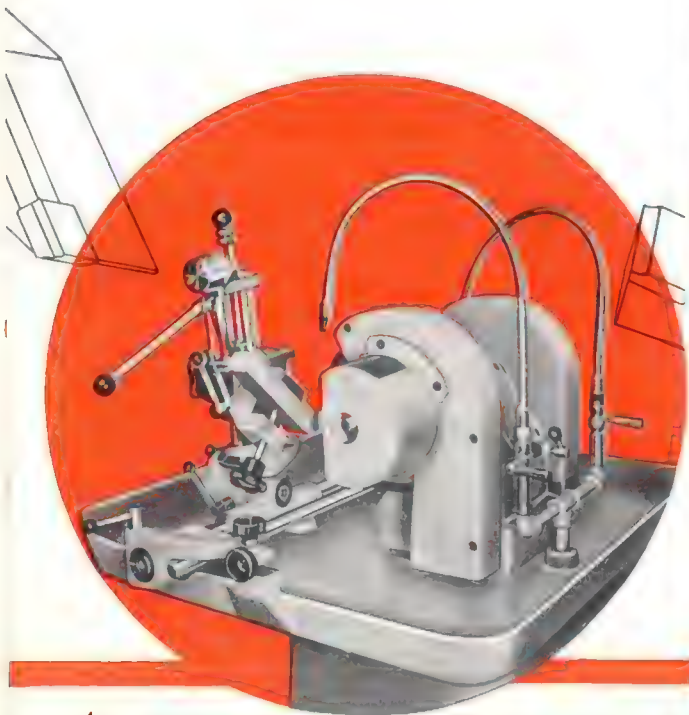


Chip breaker grinding attachment

Item 2.00.29.30

for grinding straight chip breakers with radii for breaking or curling the chips

Effortless grinding with weight-compensated vertical movement



Holder for (Ifanger, Hauser, etc.) round tools

Item 3.00.56.30

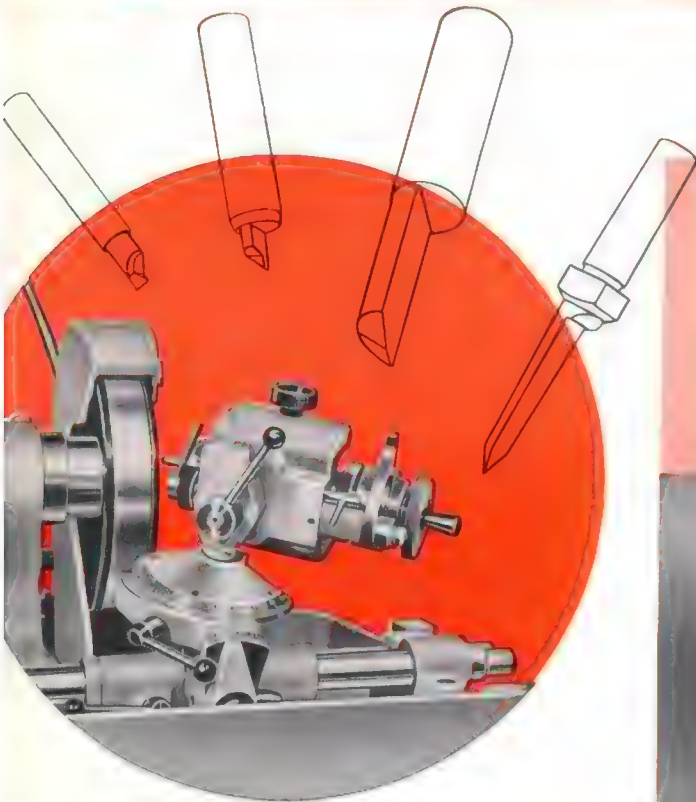


Holders for round tools of this type can be supplied on request. Available only in conjunction with the chip breaker grinding attachment.

Small cutter grinding attachment

Item 4.01.82.50

This attachment has universal angular adjustment and is used for grinding and relief grinding round tools of the following types: Single- and double-tooth milling cutters, round-shank cutters as used on jig boring machines and boring machines, round boring tools, tools as used on engraving machines, mushroom tools as used on wheel lathes, gimlets (twist drills only in certain cases), etc. Small cemented-carbide milling cutters, for example, are ground from the solid. The tools are held in a collet with a shank of $25/32$ in. (20 mm) diameter and are ground round with the crank handle or flat with a reciprocating motion.



The cutter-grinding attachment with axial infeed

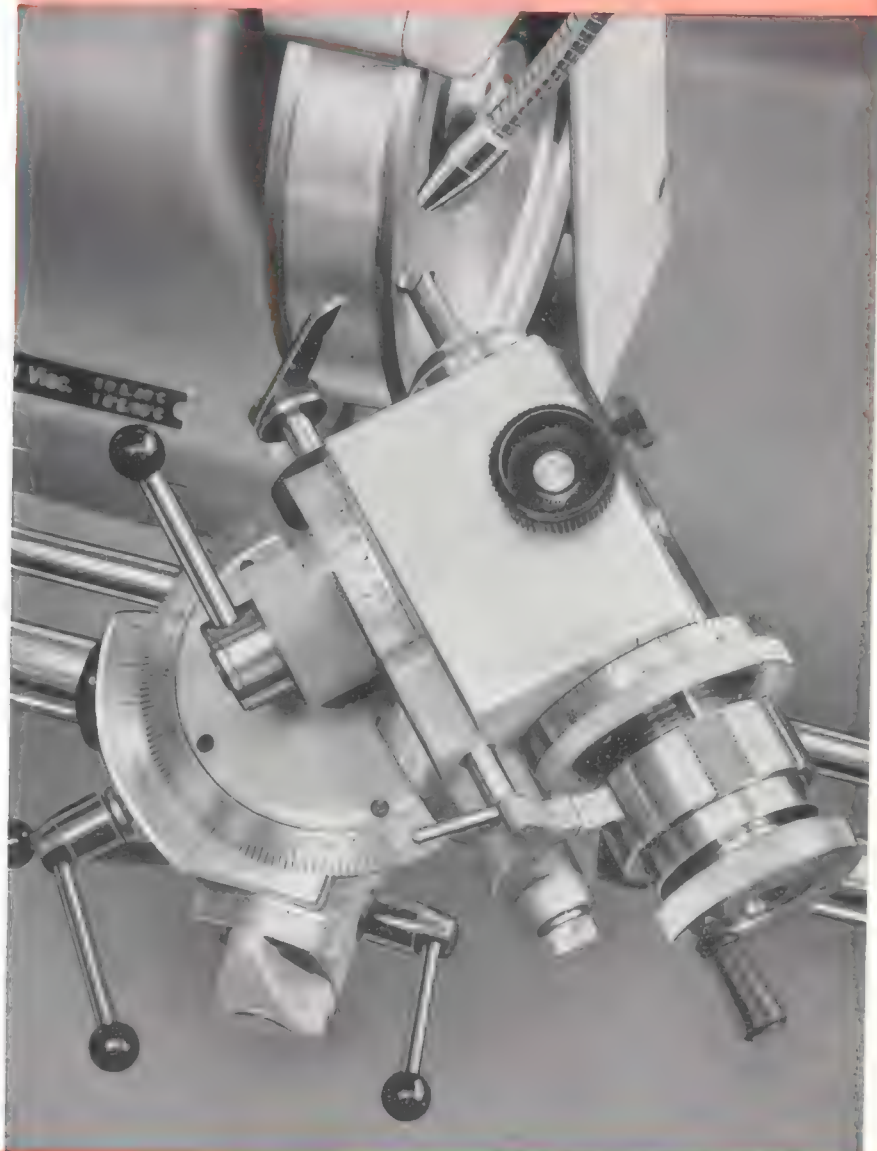
for left-hand tools Item 3.00.57.00

for right-hand tools Item 3.00.57.10

usable only in conjunction with item 3.00.56.80

Applications

1. Cylindrical or taper grinding.
2. Multi-face grinding by engagement of indexing attachment.
3. Step grinding by axial advance by means of nut.
4. Relief grinding of right-hand tools with axial screw with left-hand thread; left-hand tools require a screw with a right-hand thread.



Special accessories

for 150-A and 175-A machines



Field of vision eyepiece



C

A

B

ticule, which corresponds to the desired radius. In order to obtain perfect grinding and neat transition to the top and side rakes, the two cutting edges are set with a plus allowance of .001"-.002" (0,03-0,05 mm) beyond the desired dimension.

With a lever movement, the tool holding attachment is raised from the setting table and placed on the grinding table C, which is fixed on the machine. The clearance angle to be ground is adjusted on the machine, and the angle about which the tool holding attachment is to be swivelled is set with the adjustable stop bolts and then regulated with the fine adjustment.

The fine approach of the tool to the diamond grinding wheel is effected by using the micrometer fine setting at the guideway of the toolholder. The dimension is reached when radius, main and side rakes are ground neatly without any kink in the transitions.

The ground radius can be checked and measured on the setting table under the microscope. The reciprocating mo-



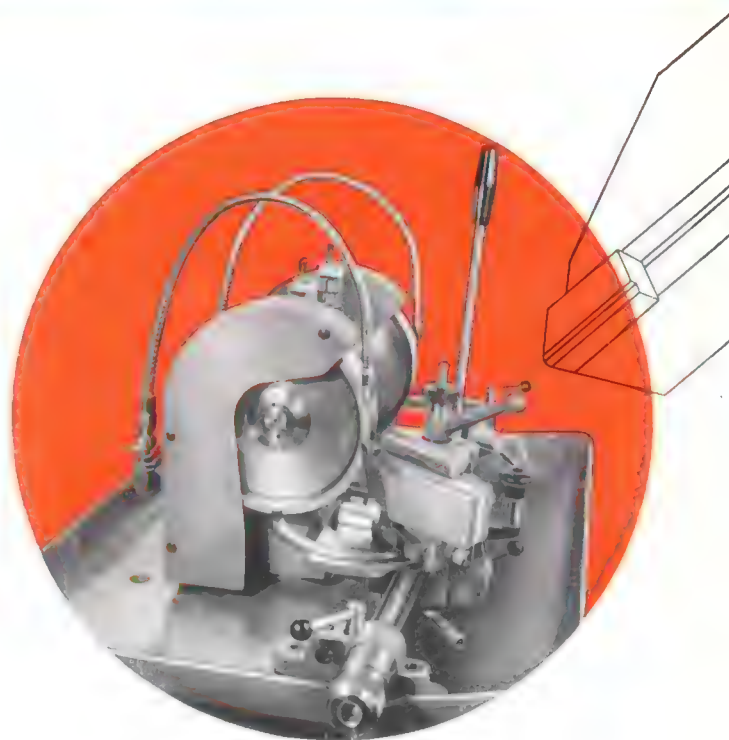
Precision Radius grinding attachment

metric Item 1.00.17.10

inch Item 1.00.19.70

Copying tools normally have to possess accurately sized and correctly shaped nose radii and have to agree with the radius of the tracer. The same applies to many other cemented tungsten carbide tools. It is true, there are some people who, as a result of years of practice, are able to grind such radii fairly well freehand, provided the radii are not too small. The nose radius on the tool must however be ground on a specially designed attachment, if it is essential that the components machined should be free of all error and distortion (such faults often necessitate costly re-machining or even scrapping of the work). The attachment shown is essentially an optical setting and measuring arrangement. It comprises a setting table A, a tool holding attachment B, and a grinding table C. The setting table carries a vertically mounted adjustable optical device with a special graticule, two adjusting micrometers, and a lighting arrangement. It is designed to take the tool holding attachment. The tool is clamped on the holding attachment B in such a way that the cutting edge runs parallel to one of the straight outside edges of the attachment.

The tool is now roughly adjusted under the microscope and firmly clamped. By means of the two adjusting micrometers, the cutting edges of the tool are moved under the microscope until they are tangent to that circle of the gra-



vement for grinding the top and side rakes is effected by means of the locking lever. The adoption of this well-designed appliance ensures rapid and perfect grinding of the nose radii.

The working and setting time is short in comparison with the time taken in freehand grinding, and the results obtained are infinitely better.



High speed steel tools are still used by the watch and apparatus industries.

AGATHON have designed a machine especially for this purpose, the type 175-AR.

Technical data

Grinding wheels, diameter	7" (175 mm)
bore79" (20 mm)
double cup, height	1.39" (35 mm)
Speed	2500 r. p. m.
Drive motor	0,55 kW
Size of tools accommodated	up to $\frac{3}{4}$ " x $\frac{3}{4}$ " (20x20 mm)
Electric pump motor	0,1 kW
Weight of machine with standard accessories	510 lbs. (230 kg)

175-AR

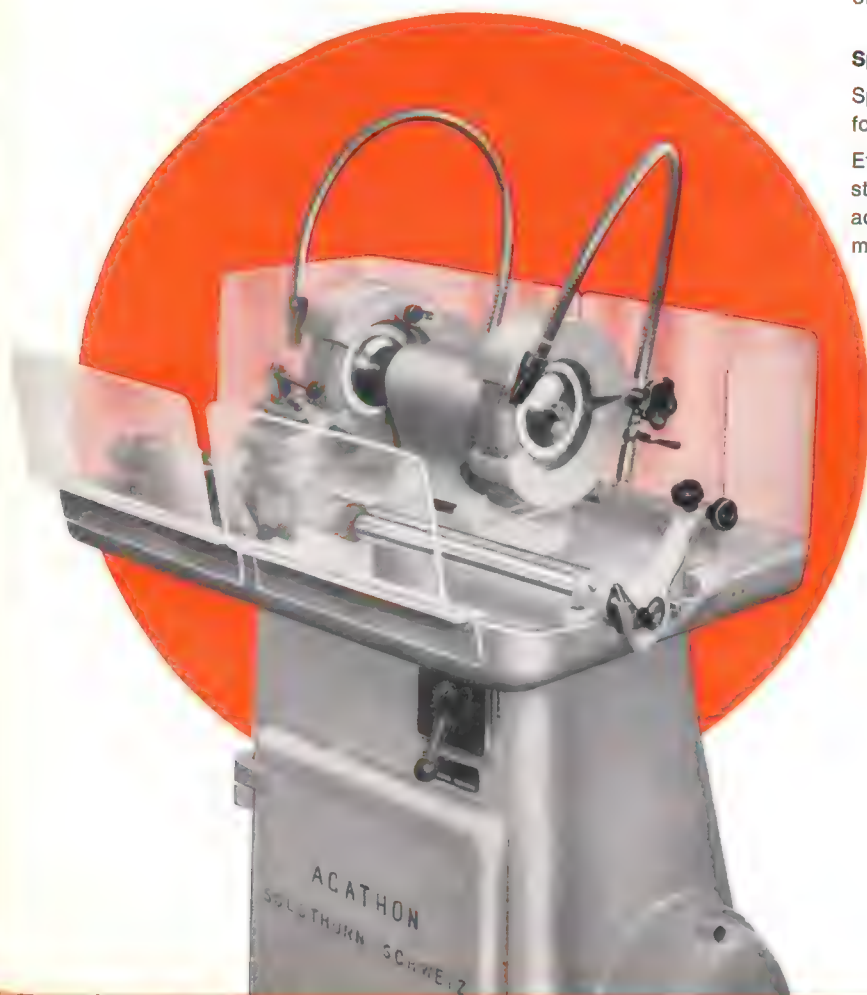
Precision grinding machine for high-speed-steel tools

Double sided wheels should definitely be used, since they have the advantage that it is always possible to grind against the cut without altering the direction of rotation of the wheels.

Special features:

Spindle with flanges and nuts, in special execution, for taking one grinding and one lapping wheel.

Effective cooling system with electric coolant pump, stainless-steel flexible coolant tubes and special adjustable coolant nozzles. Adaptable wheel-guards made of steel castings.



Dimensions, design and weight subject to alternation

Printed in Switzerland

Reproduction, even in part, forbidden

Form. 566.2. 8.76 E1

AGATHON

**TOOL-GRINDING MACHINES, SINCE
YEARS THE BEST OF THEIR KIND
ALL OVER THE WORLD**



**We offer
the following
decisive
advantages:**

Years of experience

Expert advice

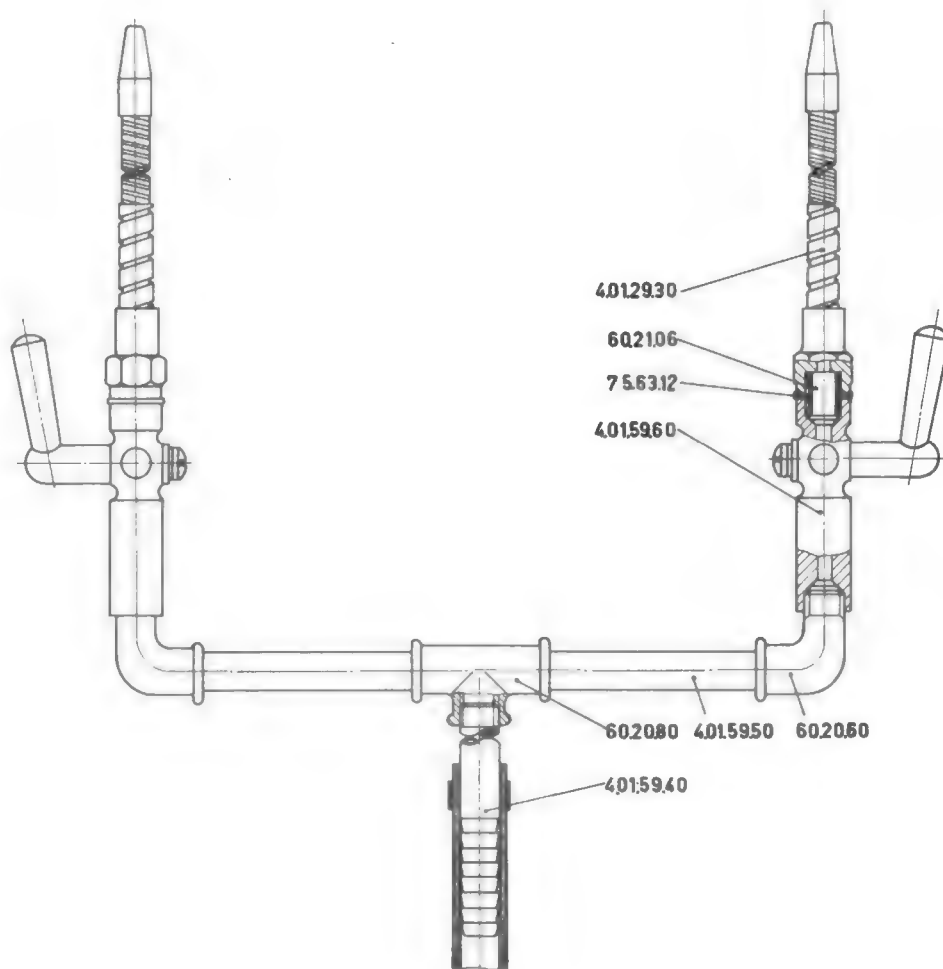
Widely assorted stock of replacement parts

High precision-interchangeability

Prompt service ensured by trained staff

AGATHON 150-A, 175-A

Kühlvorrichtung
Dispositif d'arrosage
Coolant unit

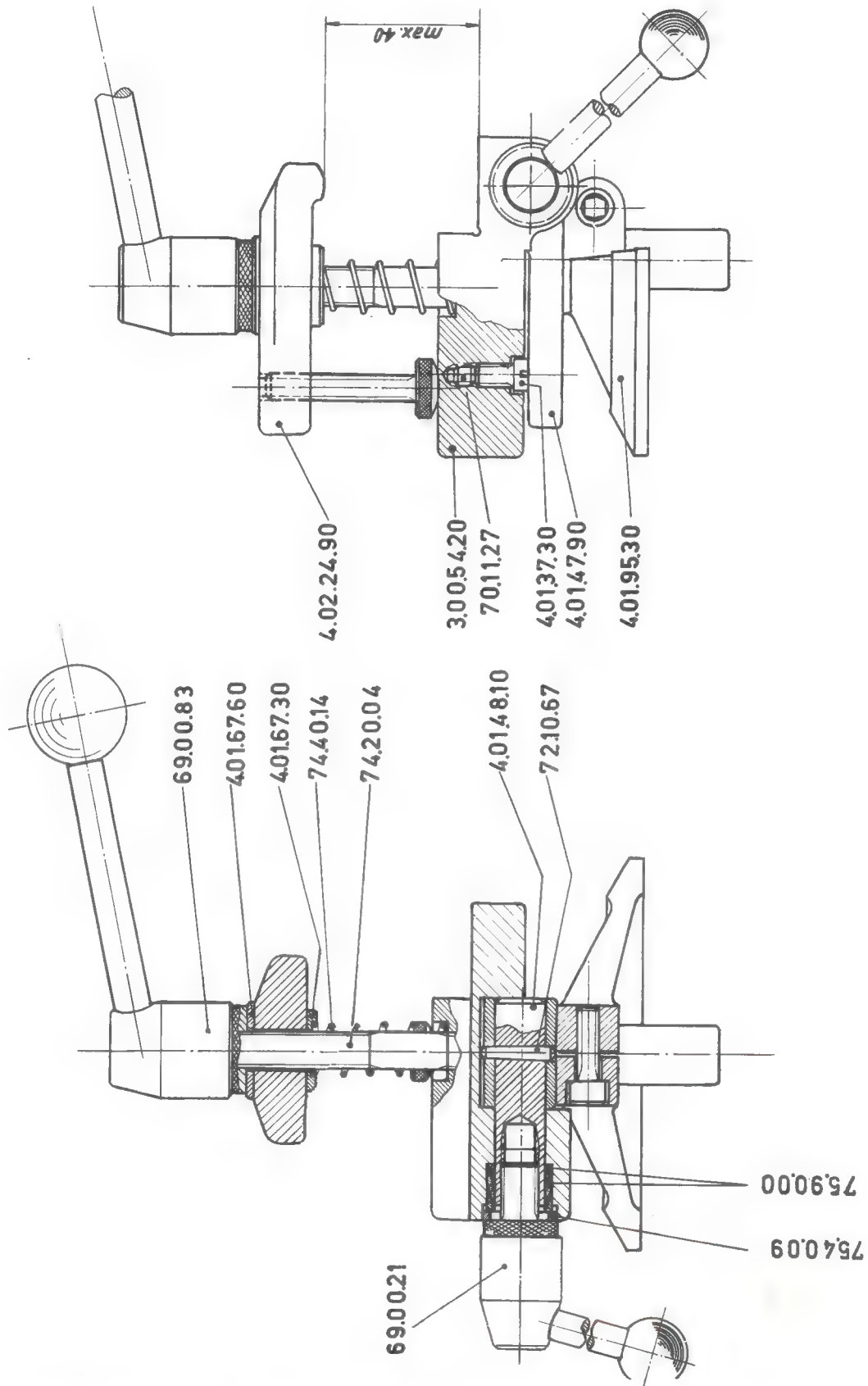


AGATHON 150-A, 175-A, 175-AR

Werkzeughalter 40

Porte-outil 40

Tool holder 40



AGATHON A.-G.
MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

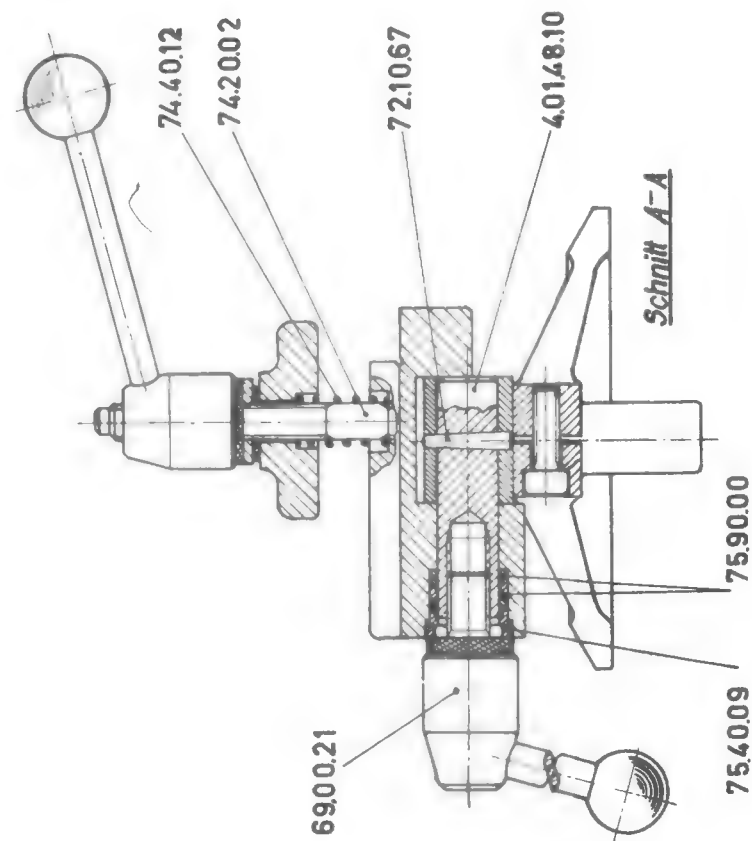
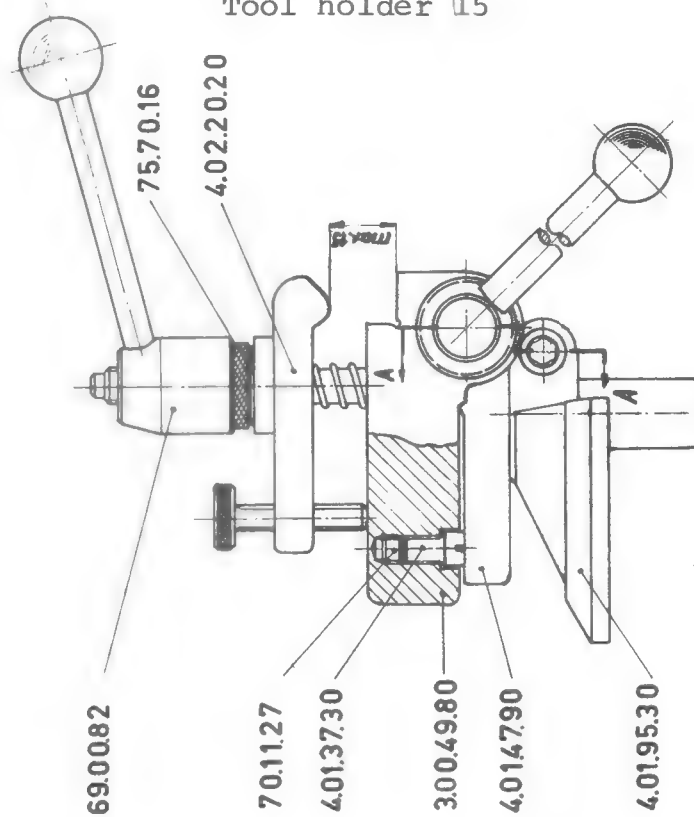
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AGATHON 150-A, 175-A, 175-AR

Werkzeughalter 15

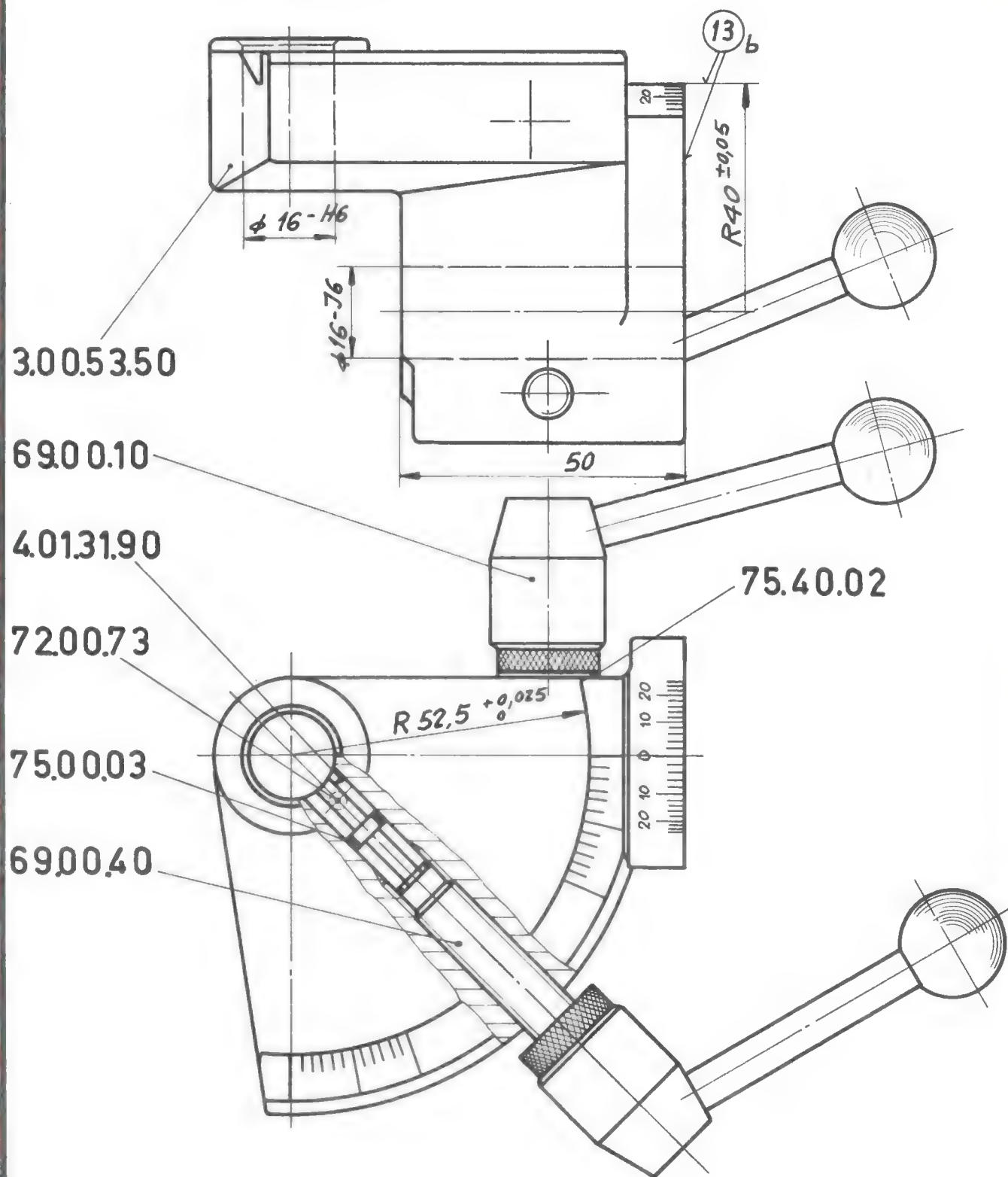
Porte-outil 15

Tool holder 15



AGATHON 150-A, 175-A, 175-AR

Halter für Werkzeugaufnahme
Support de porte-outil
Tool holder support

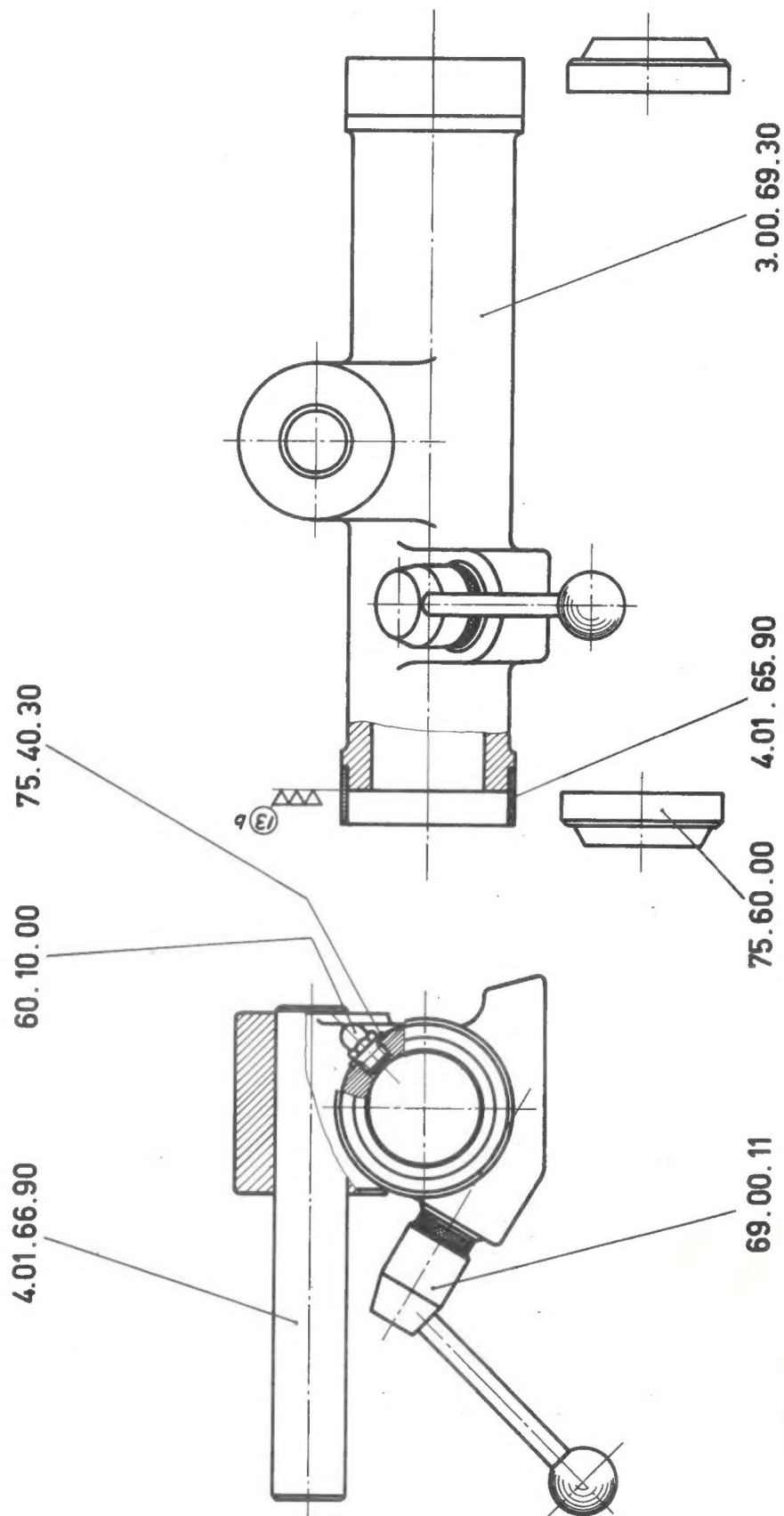


AGATHON A.-G.
MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

4.01.95.70

AGATHON 150-A, 175-A, 175-AR

Gleitsupport als Ersatz
Support coulissant de rechange
Sliding member, as replacement



AGATHON A.-G.
MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

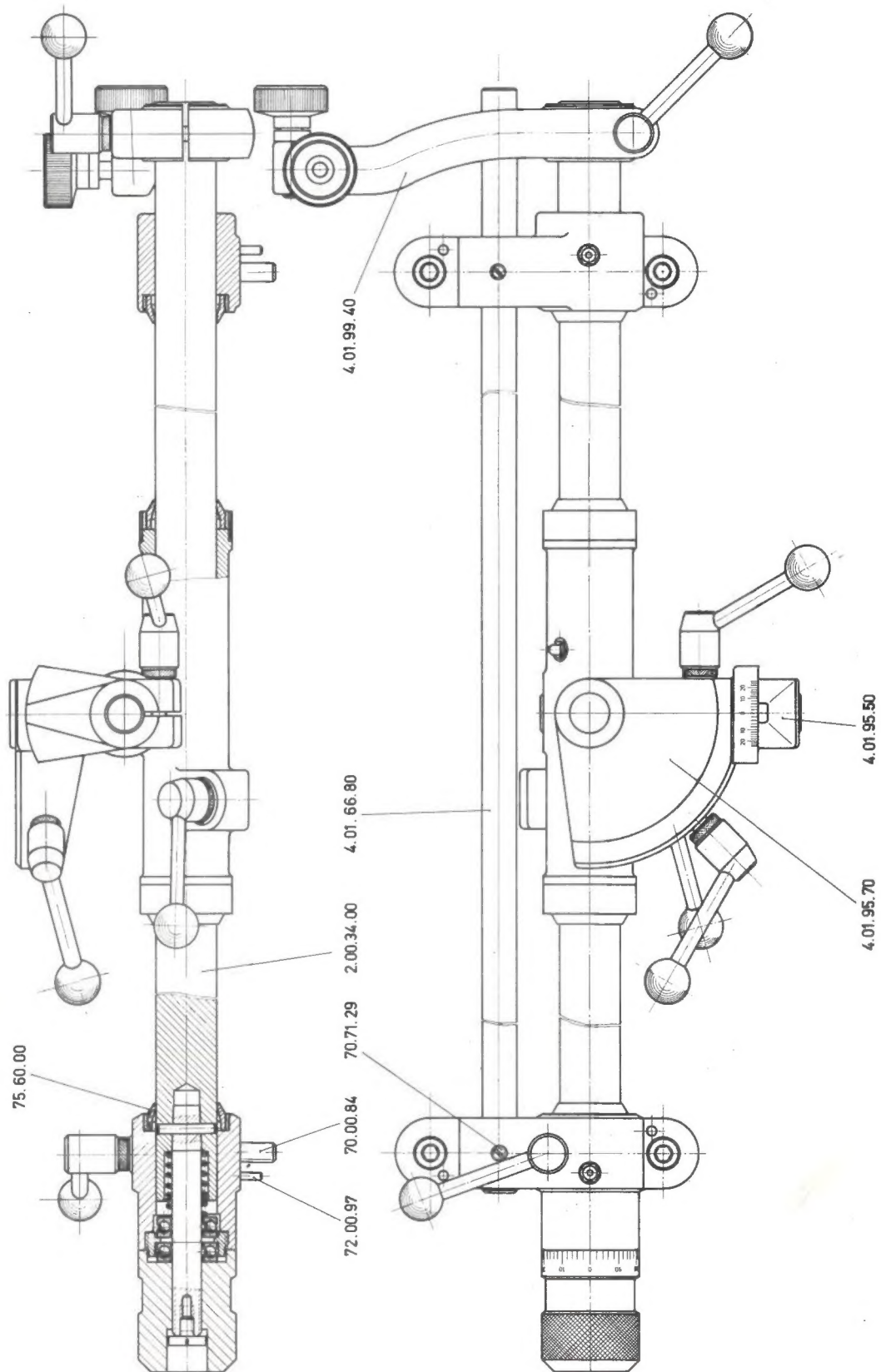
3.00.69.40

AGATHON 150-A, 175-A, 175-AR

Gleitvorrichtung als Ersatz
Dispositif coulissant de rechange
Sliding bar attachment as replacement

Zoll
Pouce
Inch

→ || ← .0005"



AGATHON A.-G.
MASCHINENFABRIK SOLOTHURN (SCHWEIZ)

2.00.34.60

AGATHON 175-A

Spindelstockwelle als Ersatz
 Arbre de poupée de rechange
 Wheelspindle, as replacement

